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ABSTRACT

The study was designed to develop and validate a set of measures that might be useful in predicting "success" in orthotic and prosthetic educational programs. Two hundred and eleven entering students from four institutions were administered the screening battery. The institutions were: Cerritos College, New York University, Northwestern University, and the University of California at Los Angeles. Measures of "success" in school and of postgraduate performance were collected from each of the subjects. These criteria were then related to the screening battery and other selected demographic variables. Included in the battery were measures of intellectual ability, mechanical aptitude, and emotional stability. Step-wise multiple regression analyses were conducted with the criterion measures from school and postgraduate performance. Results indicated that different sets of predictors and attributes were significant at each of the institutions, and that the attributes needed for "success" in school differed in certain respects from those needed for postgraduate "success." In general, depending upon the criteria used, a high degree of precision can be achieved in predicting "success" in orthotic-prosthetic education. (Author)

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THE SELECTION OF STUDENTS FOR ORTHOTIC-PROSTHETIC EDUCATIONAL PROGRAMS

Final Report

by

E. Eugene Pedersen, Ph. D.
and
Carolyn L. Vash, Ph. D.
(Project Director)

S.R.S. Grant No. 23-P-55262
Attending Staff Association of
Rancho Los Amigos Hospital, Inc.

December 1972

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December 1972

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SIGNIFICANT FINDINGS

The objective of the project was to determine if reliable predictions can be made in orthotic-prosthetic educational programs. One problem to which the study addressed itself was the description of possible differences among the various educational institutions in terms of the characteristics and attributes needed to achieve "success"; accordingly, students were sampled from the following schools: Cerritos College, New York University, Northwestern University, and University of California at Los Angeles. The battery incorporated measures of intellectual ability (the Otis Test of Mental Ability and the School and College Aptitude Test), mechanical aptitude (Bennett Mechanical Comprehension Test, Differential Aptitude Test, Space Relations), and emotional stability (Minnesota Multiphasic Personality Inventory) and interests (California Occupational Interest Inventory).

Findings

The results indicated conclusively that success in school and postgraduate performance can be achieved with a high degree of precision. However, different predictors emerged at each of the institutions. The one predictor that appeared to be most important was the student's previous level of education. At Cerritos and Northwestern the measures dealing with intellectual ability and scholastic aptitude were more significant than at NYU. On the other hand, the measures of mechanical aptitude (Bennett and Space Relations) assumed more importance at NYU and UCLA than at Cerritos or Northwestern. In general, the more "successful" subjects displayed a more stable personality profile than the less "successful." Beyond this, the personality measure yielded little significant relations.

Implications

The data from the five-year follow-up study provide administrators and educators with a basis for predicting whether or not individuals will "succeed" in the training regimen. This should offer considerable promise in providing more efficient educational programs in that the focus can be placed upon those students most likely to attain success. The study also provides a model that might be usefully applied in the area of program evaluation. That is, the succeeding phase should be addressed to program validation (what aspects of the educational process are providing students with requisite skills and behaviors needed for taking active roles in the professional community). The model and

methodology developed by the study, together with the necessary data relating to curricula and performance, should readily lend themselves to such an evaluation effort.

ABSTRACT

The study was designed to develop and validate a set of measures that might be useful in predicting "success" in orthotic and prosthetic educational programs. Two hundred and eleven entering students from four institutions were administered the screening battery. The institutions were: Cerritos College, New York University, Northwestern University, and the University of California at Los Angeles. Measures of "success" in school and of postgraduate performance were collected from each of the subjects. These criteria were then related to the screening battery and other selected demographic variables. Included in the battery were measures of intellectual ability, mechanical aptitude, and emotional stability. Step-wise multiple regression analyses were conducted with the criterion measures from school and postgraduate performance. Results indicated that different sets of predictors and attributes were significant at each of the institutions, and that the attributes needed for "success" in school differed in certain respects from those needed for postgraduate "success." In general, depending upon the criteria used, a high degree of precision can be achieved in predicting "success" in orthotic-prosthetic education.

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SELECTION OF STUDENTS FOR ORTHOTIC-PROSTHETIC EDUCATIONAL PROGRAMS

INTRODUCTION

Background and Statement of Problem

Most observers agree that the rapidly expanding need for medical services in the rehabilitation of the physically disabled has placed increasing burdens upon the institutions responsible for providing such services. The growing problem can be partly attributed to population growth coupled with the apparent increase in the occurrence of certain disabilities. This observation is particularly relevant to the practice of orthotics and prosthetics.

Heretofore, orthotists and prosthetists were recruited and trained in a variety of voluntary, informal "apprenticeship" programs. However, the apprenticeship or guild model was found to be inefficient and inadequate for the burgeoning manpower needs of the field. As a consequence, more formal academic and clinical programs were implemented in an effort to provide the necessary training for larger numbers of potential orthotists and prosthetists. While it is clear that the educational curricula and formal clinical training promises to alleviate some of the growing manpower needs of the field, an additional problem must be dealt with. Concomitant with the need for more effective and efficient training regimens is the need to select the most appropriate and promising candidates. That is, the efficiency of the training curricula can be fully realized only when the most promising candidates can be screened and admitted for training. Furthermore, in order to maximize the efficiency of the educational process it is important to be able to select only those candidates having the greatest probability of successfully completing the training. This issue relates to the problem of behavioral prediction and whether a set of criterion measures can be shown to be correlated with subsequent performance. If this can be shown to be feasible and an effective screening battery can be implemented, then we might expect a more adequate supply of promising candidates, increased efficiency of the training process, relatively greater student acceptance of course content, and more homogeneity of educational programs and curricula. Such efforts have been shown to be quite successful in other academic and professional settings and there is considerable reason to expect a similar outcome to occur in orthotics and prosthetics.

Specifically, the question that was raised by the current project was whether a set of screening criteria based upon psychometric principles could be utilized in the area of orthotics and prosthetics (O-P). Can a group of standardized measures of abilities, psychological attributes and biographical variables differentially predict those prospective candidates who have the greatest likelihood of successfully completing the training program and becoming productive members of the professional community? However, since there are a number of educational institutions located at rather disparate geographical regions of the country, the situation is considerably more complex. The issue that emerges is whether each geographical region and training institution would necessitate a separate set of predictors or whether one set of criterion measures would be adequate for the entire spectrum of educational programs. An effort was therefore made to develop both national and regional criteria that could be made available to the administrators and educators actively involved in each area.

If the conceptual and methodological issues alluded to above can be resolved, and a valid prediction battery made available to educators and administrators in the field, the educational process could be made appreciably more efficient and therefore the pressures on the existing health delivery agencies may be somewhat attenuated. A concomitant advantage to accrue would be the general elevation of the profession in that more suitably trained and motivated individuals would be provided, thereby making the certification process more meaningful.

Review of Previous Work

The philosophy and approach for the O-P student selection program grew out of an earlier two-year study (Forney, 1967). This investigation, which was conducted at Rancho Los Amigos Hospital in Downey, California, and Cerritos College in Norwalk, California, developed a battery of selection criteria and rating scales. The selection criteria were chosen apriori on the basis of clinical judgment regarding the demands of a practicing orthotist-prosthetist. Test instruments were selected so as to measure those attributes thought to be important. The test battery was administered to all entering students at Rancho Los Amigos Hospital (N = 103) and Cerritos College (N = 19). The battery was comprised of measures in three general areas, namely, intellectual ability, mechanical aptitude, and emotional stability. All areas were included that were envisaged as being necessary for successful completion of the training regimen.

In addition, a set of rating scales were devised to provide a means of evaluating student performance. These scales also measured the three areas of intelligence, mechanical ability, and personality, and were composed of five factors each. Each factor is rated on a four-point scale and the individual's rating in any one area is the sum of each of the factors. In the earlier study the rating scales were completed by knowledgeable judges (i.e., the O-P instructors). The person's obtained score was the average of the three ratings. Previous work has shown that the ratings are quite consistent in that all inter-judge agreement exceeded 95 percent.

The rating scales were completed for all the students at the completion of each semester's work. In addition, the earned grade point averages were also gathered. These data were then correlated to the results obtained from the test battery. These results indicated that reliable discriminations could be made between those trainees most likely to "succeed" and those trainees least likely to "succeed" in the training program.

In view of the limited sampling and absence of independent criteria of success (i.e., other than related to training) the results from the earlier study must be interpreted with caution. Therefore, the current study was undertaken to expand the sampling to include additional educational sites and geographical locations, and to validate the predictive criteria by gathering relatively long-term follow-up data on the students after completing their training.

Description of Setting

The research center was located at Rancho Los Amigos Hospital in Downey, California. This is a rehabilitation hospital which has extensive facilities for care of the chronically ill and for training medical and allied health professionals.

The educational institutions included in the sample were: (1) University of California at Los Angeles (UCLA); (2) Cerritos College, Norwalk, California (CERRITOS); (3) Chicago City College and Northwestern University, Illinois (CCC and NWU); and (4) New York University, New York (NYU). Both geographic disparity and divergent educational philosophies are represented by these institutions. UCLA offers a brief certification sequence of courses intended to prepare graduates for eventual certification. Cerritos offers a two-year associate of arts

course in orthotics. NWU has a combined program with CCC leading toward an associate of arts degree in prosthetics (however, a recent emphasis on orthotics has been added). NYU offers a four-year curriculum leading to a bachelor of science degree in O-P. Thus, wide divergence is reflected in the sampling of the study. It is hoped that both general conclusions might be drawn and inferences relating to each region and educational institution may be provided by the results.

The data were gathered and forwarded to the project center at Rancho Los Amigos Hospital by research aides who had been recruited and trained at each school. During the course of the study some of the preliminary results were forwarded to the schools by way of providing feedback to those involved in the educational programs. In general, a close liaison was maintained by each of the participating institutions and the project center. Also, a close working relationship was established between the project staff and the national orthotics and prosthetics organizational bodies. This proved to be most beneficial for the conduct of the various phases of the project (including the collection of follow-up data).

Selection of Students for Orthotic-Prosthetic Educational Programs

METHODOLOGY

Population and Sample

Two hundred and eleven entering O-P students were sampled from the four educational institutions. At the time the program was implemented, these institutions represented the major source of newly trained professional personnel in the field. Subsequently, additional training programs have been started. As indicated previously, these institutions were: (a) New York University, (b) Northwestern University-Chicago City College, (c) Cerritos College, and (d) University of California at Los Angeles. The following discussion will describe the characteristics of the samples drawn from each institution.

(a) New York University. Twenty-five students were sampled at New York University during the testing phase of the project. This group had an age range of 19-28 years, with a mean of 24 years. There were 23 males and two females included in the sample. At the start of their program the average educational level was 15 years, with a range of 12-16 years. The group generally represented a random sample from middle and upper middle class families, whose fathers were primarily involved in business and professional pursuits.

(b) Northwestern/Chicago City College. The sample from NWU included 70 subjects. The average age of this group was 21 years (somewhat younger than the NYU group). The range for this sample was 18-30 years. The attained educational level at the start of the program was 13.5 years, with a range of 12-16 years. It will be noted that this is fairly comparable with the NYU group. There were 70 males and no females included in the group. These data indicate that for various reasons females have not chosen or been selected to enter the field of O-P. Again, the subjects from this sample were largely from professional and/or business oriented families who may be characterized as middle or upper middle class.

(c) Cerritos College. Eighty students were included in the sample at Cerritos College. These students were generally of comparable age but had somewhat less educational background than the other groups. The mean age was 23.20 years, with a range of 18-35 years. Their average educational level at the onset of the program was 13 years,

with a spread of 12-15 years. There were 78 males and two females in the sample. Again, it would appear that female students have not been represented in the sampling of O-P students.

(d) University of California at Los Angeles. The sample from UCLA had 36 subjects. Since this program is a certification program oriented toward intensive training for graduates, the average age and educational level were appreciably higher than found at the other institutions. The average age was 26.85 years, with a range of 20-50 years. The average education level was 15 years, with a range of 12-17 years. The sample included 36 males and no females. In general, these students were from middle and upper middle class professional families, with considerable emphasis upon academic and professional pursuits.

Test Instruments

The finally adopted selection battery was comprised of seven standardized psychometric instruments. Six of these instruments had been employed in the previous exploratory study. The seventh instrument, a measure of attitudes toward disabled persons (ATDP) was added in an effort to improve the accuracy of prediction achieved by the battery as recommended by the earlier findings (Forney, 1967). These scales (Yukor, Block, and Younng, 1966) basically measure the way in which individuals view the physically disabled. The scales are composed of "Likert-type" attitude items assessing the extent to which the disabled individual is viewed as being "special" or is perceived as being different from non-disabled individuals. It was hypothesized that to possess sufficient involvement and motivation to complete the prescribed training regimen and eventually enter the field of O-P, one should possess relatively favorable attitudes toward the disabled. However, it might be added that such attitudes should probably be tempered by a certain degree of realism. Therefore, the scales were included in order to determine the extent to which such attitudes may influence an individual's achieved "success" in the field of orthotics and prosthetics. If this proves to be the case, then the ATDP should serve to increase the precision of the resultant prediction.

The remaining instruments in the test battery measure performance in three broad psychological areas: namely, intellectual ability, mechanical aptitude, and emotional stability. The test instruments are:

Selection of Students for Orthotic-Prosthetic
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Otis Self-Administering Test of Mental Ability - Higher form (Otis); School and College Aptitude Test Form 1-A (SCAT); the Bennett Test of Mechanical Comprehension, Form BB (Bennett); the Space Relations Test of the Differential Aptitude Test - 12th grade norms (Space Relations); Minnesota Multiphasic Personality Inventory (MMPI); California Occupational Interest Inventory (COII).

The Otis has been a commonly used measure of general intelligence. It is a briefly administered scale which yields a score that can be translated into I.Q. units; therefore the interpretation and meaning of obtained performance is readily understood. The SCAT is conceived of as a measure of one's ability or potential for successfully completing a general college curriculum. It is composed of three sub-measures: viz., verbal ability, quantitative ability, and a total score. The person's obtained score in each of these areas is compared to the appropriate normative data provided by the test's publisher. The test has been used quite extensively in college guidance and counseling programs. The Bennett is a measure of one's analytical skills and ability to effectively solve problems dealing with the area of mechanics and classic physics. The test has been shown to be most useful in the area of predicting success in science and engineering curricula. The Space Relations test is a sub-test of the Differential Aptitude Test (DAT). The instrument evaluates the person's ability to envision how an object that has been portrayed in flat two-dimensional renditions would appear in three-dimensional space. This attribute has been found to be important in certain types of occupations involving engineering skills. Accordingly, this measure was included in the battery in view of the heavy emphasis on design in the O-P field. The MMPI is a widely used clinical instrument which yields an estimate or prediction of the level of personality adjustment by the person. In view of the importance of personality stability for the successful completion of a higher educational program and the apparent importance of personality factors in the practice of O-P, this measure was felt to be an essential part of the selection battery. The COII was included in an effort to assess the potential influence of other motivational or interest factors. The instrument deals with six types of occupational interest: namely, personal-social (i.e., helping types of occupation), nature ("out-of-doors" occupational pursuits), business detail, art, science, and mechanical. Also, the test assesses three occupational areas--verbal, manipulative, and computational. In addition, the instrument yields a score of level of interest or the extent to which the person desires to work independently

of others. This latter score is theoretically thought to be an index of the individual's level of maturity. It may be that higher levels of interest would be associated with higher levels of attained success.

In addition to the test battery, the entering student was administered a Personal Information Questionnaire (see Appendix A). This instrument was developed to gather a variety of demographic information related to the candidate's educational history, family background, military experience, occupational history, and other relevant background data. Such information was thought to be important in terms of deriving a more adequate description of the entering O-P students and may be related to the individual's achieved success. Especially of interest was the occupation of the candidate's father (i.e., whether professional, orthotist-prosthetist, medical profession, etc.). It was felt that this data would be of special interest.

Instructors' Rating Scales

The instructors' rating scales are composed of three psychological dimensions. These dimensions generally parallel the three areas of the test battery. A four-point scale was established for each of the five factors comprising each dimension (i.e., outstanding, good, fair, and poor). Initially these dimensions and their corresponding factors were derived by consensus from the clinical experience of the Rancho Los Amigos Hospital personnel.

The instructors at each institution served as judges. They were not advised of the scores obtained by the ratees until after the completion of the semester. The subject's score for each dimension was the weighted scores on each factor for all the raters.

A relatively high degree of consistency in judging was obtained by the scales. Review of Table I (which also contains a description of the constituent factors) indicates a fairly high degree of inter-judge reliabilities was obtained.

Employment Inventory (see Appendix B)

An integral part of the study was the definition and derivation of suitable criterion measures in terms of which long-term "success" might be measured. A critical aspect of this problem is that the measures should reflect other dimensions of behavior than merely performance in the

TABLE I

Reliability Coefficients for the
Instructors' Rating Scales

Item	Institution			
	NYU	NWU	Cerritos	UCLA
No. of Raters:	4	6	3	3
Intellectual Ability:	.67	.92	.69	.88
(a) Adjustment to new ideas				
(b) Problem-solving attitude				
(c) Application of previous learning				
(d) Analytical reasoning ability				
(e) Ability to make generalizations from previous knowledge				
Mechanical Aptitude:	.85	.87	.74	.76
(a) Technical competence in use of mechanical principles				
(b) Understanding of physical principles				
(c) Hand dexterity				
(d) Spontaneous application of physical principles to novel problems				
(e) Space perception				
Emotional Stability:	.78	.91	.85	.80
(a) Enthusiasm and vitality				
(b) Control under stress				
(c) Evenness of temperament				
(d) Sexual identity				
(e) Acceptable anxiety release				

training regimen. Toward this end a questionnaire was developed to be completed at certain strategic points in the graduate's career. In this inventory, the graduate's date of employment, name of employer, and principal job responsibilities were listed, as well as reasons for entering the field (i.e., altruistic, interest in work, financial, etc.), how the job was procured, plans for certification, and any immediate or long-term professional goals. All these items were thought to be important in terms of uncovering additional dimensions of employee "success" and motivation. Information from the questionnaire was gathered by the research aides at each institution. In cases where responses were not obtained, follow-up letters and self-addressed and stamped envelopes were sent out.

Employee Information Questionnaire (see Appendix C)

A rating schedule, which was completed by the employer, was also constructed in order to derive a more adequate set of criteria for defining "success." The graduate's job responsibilities are described and performance in fulfilling these responsibilities is rated on a four-point scale. The form also contains such data as amount of salary paid, anticipated salary increases, degree of leadership potential, amount of absenteeism, degree of cordial relationships with fellow employees (rated on a four-point scale), any outstanding qualities, and, if employment had been terminated, the reasons for such termination. Important information relative to the trainee's postgraduate performance was yielded by this questionnaire and related to test performance.

Certification Scores

After successful completion of training and the prescribed "clinical" or "intern" type experience, the individual is qualified to take the American Board of Certification examination. This is given in either prosthetics or orthotics. The exam is composed of written and theoretical segments, and both an oral and clinical section. Clearly, the ultimate requirement of such a screening battery is to predict those candidates most likely to become certified (i.e., qualified as professionals). Therefore, a part of the study involved collecting certification exam performance scores of those former students who attempted the certification examination. These test results were then related to the original test scores obtained on the test battery and performance in the training regimens. Later discussion will consider this aspect of the evaluation in greater detail.

Selection of Students for Orthotic-Prosthetic
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Procedures

All entering students were administered the complete test battery by the research aides at each school. The complete battery consumed 5-1/2 hours and was completed in two test sessions. The Personal Information Questionnaire, Otis (30 minutes), SCAT (1 hour and 30 minutes), and Bennett (30 minutes) were administered the first day. The Space Relations (30 minutes), MMPI (1 hour), COII (1 hour), and ATDP (30 minutes) were administered during the second session. Standard administration procedures and appropriate time limits were carefully adhered to. This was assured after the research aides had been given initial instruction in administration of the test battery and related data gathering procedures. The completed test data were forwarded to the project center at Rancho Los Amigos Hospital.

At the completion of each semester the student's performance was judged with the instructors' rating scale. The rating data and the grades that had been earned were collated and sent to Rancho Los Amigos Hospital by the research aides through the cooperation of the institutions involved.

To ensure adequate evaluation of post-training performance, follow-up data (i.e., information contained in the questionnaire and employment inventory) were gathered immediately after graduation, six months, one year, and two years after graduation. This was done in an effort to reflect any possible changes that may have occurred after completion of professional training.

Five years were devoted to the project. Efforts were directed toward two distinct phases of the study. These were: (1) the testing and training phase, and (2) the follow-up phase. The latter phase was continued up through the final year of the study.

Design

All the data relating to performance in school and after graduation were related to the numerous independent or predictor variables. To accomplish this a multiple-factor analysis, replicated across institutions, was used as being the most efficient method to determine the most important predictor variables. Multiple step-wise regression analyses were used (in which test performance and other subject variables were regressed against the weighted criterion measures) in order to derive

the necessary local and regional norms. The final results will be a set of norms that will be applicable to each of the training sites. Resultant test profiles should indicate the minimum performance levels needed to ensure the maximum probability of obtaining "success" in the training program and subsequent productive employment in the field. A separate set of analyses will be presented for school performance and post-graduate performance.

The following discussion will deal with the results obtained from all schools combined. This will be succeeded by the consideration of the data from each institution separately. Finally, the obtained data will be presented in the form of proposed norms. The final section will deal with a discussion and implication of the findings.

RESULTS

For ease of exposition, the description of findings will be organized around three major sets of data. These are:

(1) Descriptive findings. This will include an over-all description of entering candidates and a summarization of test data from each training site. An effort will be made to focus on the areas of commonality and divergence among the schools.

(2) Predictive findings--School performance. These analyses will be addressed to how effective the various independent variables are in predicting performance achieved in school. Both instructors' ratings and grade point averages will constitute the dependent variables. Included will be both a consideration of over-all analyses (with the training site variable collapsed) and separate analyses within each school. The former will be considered in an effort to develop a general test of the adequacy of prediction, while the latter will be presented in order to uncover any possible interaction effects between training sites and level of prediction afforded by the various measures.

(3) Predictive findings--Post-training performance. Included will be an emphasis upon the various employment criterion measures of success and performance on the certification test. It should be noted that the certification test results demand a different approach to analysis. In view of the fact that only a relatively small proportion of the original sample completed all the prescribed training and the requisite clinical training for certification (and that even fewer students from NYU or UCLA were able to do so than from the other schools), the analysis of these data was conducted for all the schools combined and did not look at each school separately. It will also be noted that the relation between certification score and other measures of professional success can be viewed as a validation of the certification test. At this juncture it is hoped that subsequent study can be implemented to extend the period of follow-up so that all the students from NYU (which is a four-year curricula) and UCLA can be included in the analysis.

Finally, since ultimate predicted success in the field depends upon the adequacy of the screening criteria as well as the type of training

received, an evaluation should also be conducted of the training programs. Therefore, one should also validate the training curricula in order to have a more comprehensive set of data. However, conduct of program evaluations was not designed into the current research effort. It should be noted that such evaluation must be accomplished before a satisfactory validation can be performed. In an effort to provide some information related to this issue, a part of the present analyses will be addressed to a cross-school comparison using measures that have an apparent degree of applicability to each of the regions and institutions. This will only represent an initial approximation to such an analysis, however.

(1) Descriptive Findings

Table II contains a summary of the demographic and descriptive statistics obtained from the samples drawn from each of the schools. Table III presents the means and standard deviations of the psychometric data obtained from each school.

Examination of Table II reveals a number of differences among the participating schools, indicating that each apparently had used different approaches to the selection of students and that their backgrounds reflect these differences in philosophies. For example, the students from UCLA are older than those from the other schools. In addition, their educational background appears to be more extensive. This would be quite consistent with the type of program offered at UCLA which can be characterized as being a postgraduate program designed to further impart requisite skills for professional certification.

In terms of the occupational histories of parents, the unskilled and technical occupational groups are more predominant among the Cerritos and Northwestern parents (the two community colleges), where as the professional and business management type of occupational pursuits are relatively more prevalent among the parents of students at NYU and UCLA. This observation could partly reflect a difference in screening procedures exercised by each of the schools.

An additional observation of interest is the high number of students who indicated that their fathers were involved in orthotics-prosthetics. With the exception of Cerritos College, all schools exceeded 25 percent of the parents who were in orthotics and prosthetics; at Cerritos the percentage

TABLE II

SUMMARY OF DEMOGRAPHIC AND DESCRIPTIVE DATA OBTAINED FROM EACH TRAINING SITE

Item	INSTITUTION							
	Cerritos		NYU		NW/CCC		UCLA	
	(Proportion of Sample)							
SEX								
Female	.04		.08		0		0	
Male	.96		.92		1.00		1.00	
AGE								
Mean	23.45		23.73		24.41		28.31	
S.D.	6.95		3.89		3.07		9.05	
Range	18.00-48.00		18.00-33.00		18.00-30.00		20.00-50.00	
EDUCATIONAL LEVEL								
Mean	12.64		13.77		12.46		14.19	
S.D.	2.16		1.37		1.09		2.92	
Range	12.00-16.00		12.00-16.00		12.00-16.00		12.00-17.00	
PARENTS' EDUCATIONAL LEVEL	Mother	Father	Mother	Father	Mother	Father	Mother	Father
(Proportion of Sample)								
Elementary	.17	.12	.00	.00	.03	.05	.00	.06
High school	.44	.41	.63	.81	.71	.53	.06	.58
Tech/Trade	.22	.27	.04	.04	.07	.19	.79	.10
Some college	.07	.02	.04	.04	.03	.05	.01	.06
College graduate	.06	.08	.27	.09	.14	.16	.17	.17
Post-graduate	.05	.06	.00	.00	.00	.00	.00	.00
PARENTS' OCCUPATIONAL LEVEL	Cerritos		NYU		NW/CCC		UCLA	
Mother's (Proportion in Sample)								
Housewife	.51		.68		.64		.65	
Clerical	.35		.13		.22		.12	
Technical	.08		.04		.02		.00	
Professional	.03		.04		.02		.12	
Orthotic-Prosthetic	.00		.00		.00		.00	
Medical	.03		.09		.09		.10	
Father's (Proportion in Sample)								
Unskilled labor	.34		.00		.12		.06	
Tech./Management	.25		.00		.22		.25	
Business	.13		.45		.27		.15	
Professional	.06		.20		.03		.09	
Orthotic-Prosthetic	.17		.25		.34		.31	
Unemployed	.01		.00		.01		.00	
Medical Doctor	.03		.10		.00		.03	
Deceased	.01		.00		.01		.09	
MARITAL STATUS (Proportion in Sample)								
Single	.71		.54		.62		.31	
Married	.26		.46		.35		.69	
Divorced	.01		.00		.00		.00	
Widowed	.00		.00		.01		.00	
PHYSICALLY DISABLED								
Yes	.18		.23		.09		.00	
No	.82		.77		.91		1.00	
TYPE OF DISABILITY (Proportion in Sample)								
Paraplegic	.60		.00		.20		.00	
Quadriplegic	.00		.00		.00		.00	
Lower extremity amputee	.06		.60		.00		.00	
Sensory disability	.06		.00		.40		.00	
Spinal injury	.08		.20		.00		.00	
Post-poliomyelitis	.20		.20		.40		.00	
MOST INTERESTING AREA OF STUDY IN SCHOOL								
(Proportion in Sample)								
Liberal Arts	.33		.40		.46		.46	
Science & Technical	.52		.45		.46		.40	
Physical Education	.13		.15		.08		.14	

was 17 percent. It would appear that a large proportion of the study sample reflected a strong potential family influence. However, previous analysis (see Pedersen and Wetmore, 1969) showed that in terms of the level of performance there were no differences between students whose parents were in orthotics and prosthetics and those whose parents were in other pursuits.

With regard to marital status, it is of interest to note that most of the students at Cerritos were single (71 percent), which is consistent with the predominantly younger ages found in this group. Most of the students at UCLA, by way of contrast, were married (i.e., 69 percent), which is also consistent with the older ages of this sample. About half of the sample at NYU and Northwestern were married (46 percent and 35 percent respectively).

Another demographic variable considered was the incidence of physical disability among trainees. Both Cerritos and NYU were comparable (18 percent and 23 percent respectively) while Northwestern only had nine percent and UCLA had no disabled students.

With respect to the psychometric parameters, a number of marked differences emerge when data contained in Table III are reviewed. NYU students displayed the highest average scores on the Otis Test of Mental Abilities; Northwestern, UCLA, and Cerritos students performed at somewhat lower levels. In terms of academic aptitude (SCAT), all schools showed elevated scores on the verbal and lowered scores on the quantitative sub-scales. NYU students in general had higher scores than the other schools, possibly reflecting some differences in student screening and the fact that NYU has a full four-year program leading to the bachelor's degree.

Table III shows that with respect to the Bennett Mechanical Comprehensive Test and the Differential Aptitude Test-Space Relations, it is noteworthy that NYU and UCLA are extremely similar (both with relatively high average scores), while Cerritos and Northwestern are also comparable. This would also appear to reflect prevailing differences in the types of students selected for the programs.

Review of the profiles of occupational interests (COII) obtained for each of the schools is of interest. Cerritos and UCLA had elevated interests in personal-social occupations (70.58 and 72.56 percentile respectively).

TABLE III

SUMMARY OF PSYCHOMETRIC DATA
OBTAINED FROM EACH TRAINING SITE

	INSTITUTION			
	Cerritos	NYU	NW/CCC	UCLA
INTELLIGENCE				
1.Otis Test of Mental Ability (Adult norms)				
Raw Score				
$\bar{X}$	47.50	60.95	50.30	55.88
SD	10.93	5.94	10.44	12.04
I.Q.				
$\bar{X}$	104.88	119.00	108.00	114.03
SD	15.06	5.86	10.46	12.10
2.SCAT (1A norms percentile)				
Verbal				
$\bar{X}$	42.35	70.64	50.93	60.25
SD	27.64	29.80	25.68	20.92
Quantitative				
$\bar{X}$	37.83	54.36	46.41	56.91
SD	27.57	25.69	22.77	29.88
Total				
$\bar{X}$	39.42	68.05	49.13	60.75
SD	27.41	29.74	24.63	26.91
APTITUDE				
1.Bennett Mechanical Comprehension (Form BB: Percentile)				
$\bar{X}$	32.14	64.18	31.34	49.16
SD	25.08	23.08	24.55	23.97
2.DAT (Space Relation - Grade 12)				
$\bar{X}$	56.83	81.14	52.57	75.81
SD	27.56	21.67	28.01	22.42
Personality & Interest				
CO II (Adult level: Percentile)				
P-S $\bar{X}$	70.58	58.14	54.61	72.56
SD	30.31	28.20	28.03	27.22
Natural $\bar{X}$	40.60	51.86	55.86	55.97
SD	28.26	5.39	25.52	25.43
Mech $\bar{X}$	55.94	66.00	64.29	64.66
SD	32.30	35.68	31.86	33.30
Bus $\bar{X}$	25.86	14.82	34.38	20.22
SD	25.81	21.21	25.43	26.09
Art $\bar{X}$	32.50	41.32	24.16	28.03
SD	31.10	31.21	23.54	26.06
Sci $\bar{X}$	50.09	56.82	50.86	53.91
SD	31.70	31.64	29.87	28.98
Verbal $\bar{X}$	50.10	43.36	45.34	46.25
SD	26.89	25.59	26.74	23.93
Man $\bar{X}$	40.95	39.55	33.59	40.94
SD	19.17	9.50	12.92	12.79
Comp $\bar{X}$	41.11	37.50	47.79	40.13
SD	27.08	23.74	25.82	25.75
Level of Int $\bar{X}$	64.17	84.05	76.77	85.59
SD	31.43	24.10	24.96	12.86
MMPI (T scores)				
L $\bar{X}$	45.19	50.50	48.95	49.88
SD	15.56	8.34	9.96	11.74
F $\bar{X}$	49.[illegible]	56.09	53.86	49.88
SD	16.4[illegible]	6.95	11.36	10.12
K $\bar{X}$	51.21	58.68	54.50	58.41
SD	17.15	8.27	12.04	14.53
1 $\bar{X}$	50.00	53.22	51.50	51.88
SD	17.84	9.45	12.98	12.22
2 $\bar{X}$	49.06	52.64	50.16	50.50
SD	17.76	6.77	13.35	11.14
3 $\bar{X}$	53.09	58.68	54.39	56.59
SD	17.71	8.42	10.52	12.16
4 $\bar{X}$	53.92	58.09	57.21	53.19
SD	19.10	8.91	12.72	12.48
5 $\bar{X}$	53.56	57.59	54.20	57.69
SD	18.54	9.09	11.32	12.60
6 $\bar{X}$	49.58	55.77	51.20	50.84
SD	17.23	8.21	10.96	11.30
7 $\bar{X}$	50.63	53.90	54.63	53.03
SD	17.44	8.54	13.19	11.83
8 $\bar{X}$	52.29	58.86	57.27	52.63
SD	19.26	8.97	14.70	12.58
9 $\bar{X}$	52.19	59.73	61.98	55.63
SD	20.25	17.19	14.15	14.41
Attitudes Toward Disabled				
Raw $\bar{X}$	59.36	87.86	75.84	86.59
SD	61.04	48.86	58.54	61.81
Percentile $\bar{X}$	28.96	38.86	38.93	46.63
SD	34.27	31.94	34.31	37.92

All students displayed elevated interests in occupations dealing with mechanical considerations. Also, all the students displayed high level of interest scores, or were interested in occupations requiring a high degree of independence. In terms of personality stability as measured by the MMPI, inspection reveals no remarkable differences between the schools.

No outstanding differences with respect to Attitudes Toward Disabled Persons are observable in these data. Cerritos had a mean of 18.96 percent which is somewhat lower than NYU (38.86 percent), Northwestern (38.93 percent), and UCLA (46.63 percent). The apparent disparity between the raw scores and the percentile scores stems from the fact that different sets of norms were used for disabled and non-disabled, and for males and females. Therefore, the averaged percentiles will also reflect the different compositions of samples from each of the schools. This observation is illustrative of the need to develop local norms for these scales.

(2) Predictive Findings - School Performance

Over-all analysis: Of the various criteria measures available with which to study "success" in school, in the interest of economy only a limited number were selected for analysis. These were (1) whether or not the student completed the program, (2) the number of units completed, (3) grade point average, and (4) instructors' ratings (pooled over each year). Each of these dependent variables were used in separate regression analysis models since each measure defines a different aspect or feature of "success." Therefore, depending upon the particular emphasis or framework, each set of the analyses might be relevant.

In conducting the stepwise multiple regression analysis, each potential independent variable is "stepped-in" in accordance with how much of the total variance it can account for. Thus, the first step in the analysis selects the best independent variable in terms of its predictive power as assessed by the intercorrelation matrix. The second step in the program selects the next best predictor (holding all other variables constant). This process continues so long as there are available potential variables or until that point at which it is determined that further improvement in prediction cannot be attained. Previous evaluation revealed that beyond four independent variables contributed less than .01 percent change in the level of prediction; therefore it was decided to discontinue the regression analyses after four independent variables had been stepped-into the prediction equation.

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In the succeeding discussion the simple intercorrelation matrices will be presented for each dependent variable. This will be followed by the results of the regression analyses, and finally, the prediction equation will be included in the tables. The initial part of the narrative will consider the general analyses (i.e., with the school variable collapsed). Finally, the results obtained from each of the schools will be considered separately in an effort to uncover the possible interaction effects with the various predictor variables.

Table IV presents a summarization of analyses for the over-all data. The table also contains separate treatments of data for each of the criterion measures. As indicated previously, the reason for conducting separate analyses was that each of the criterion measures deals with somewhat different aspects of "success" in school.

In terms of the magnitude of relationships between predictor and dependent variables, the Grade Point Average (GPA) appeared to yield the most useful results. This probably reflects the fact that GPA is a variable in terms of which the subjects were more evenly distributed over a larger range of values. This would also be a valuable variable from the point of view of the educator (i.e., it would be more important to be able to predict earned GPA than number of units earned or any of the other measures relating to school performance).

Tables IV-A and IV-B show the predictor variables that were stepped-in to the prediction equation using completion of the program as the criterion measure. The independent variables were (1) previous educational level (i.e., amount of school experience prior to entry into the program), (2) interest in science occupations as measured by the California Occupational Interest Inventory, (3) expressed reasons for entering the field, and (4) attitudes toward disabled persons. The third predictor should be described further. Subjects were queried on why they initially entered the field of orthotics-prosthetics. The reasons expressed were categorized in terms of various types: (a) altruistic, (b) interest in type of work, (c) financial returns, (d) family influence, (e) to get further background for medical or paramedical profession, and (f) individual was disabled. It is of interest to note that higher previous educational level was associated with successful completion of the program. Interest in scientific occupations on the COII was negatively correlated with completion of the program (although this correlation was only marginal). With regard to the reasons for entering the field, the correlation indicates that those

TABLE IV

RESULTS OF PREDICTIVE ANALYSES CONDUCTED WITH SCHOOL PERFORMANCE DATA DISREGARDING TRAINING SITES

A. INTERCORRELATIONS AMONG THE SELECTED INDEPENDENT VARIABLES AND WHETHER OR NOT STUDENT COMPLETED TRAINING PROGRAM

Variable	1	2	3	4	5
1. Previous Education Level	-	-.028	.067	-.047	.287
2. Coll-Science		-	-.184	.151	-.197
3. Reasons for Entering Field			-	-.014	-.147
4. ATDP				-	.109
5. Completed Program					

B. SUMMARY OF MULTIPLE REGRESSION ANALYSES WITH WHETHER STUDENT COMPLETED PROGRAM AS DEPENDENT VARIABLE

	Multiple		Change	
Variable	R	R^2	In R	F
1. Previous Education Level	.287	.082	.082	1.45*
2. Coll-Science	.344	.118	.035	0.96
3. Reasons for Entering Field	.401	.160	.042	0.69
4. ATDP	.430	.185	.025	0.40

(* Not significant)

C. INTERCORRELATIONS AMONG THE SELECTED INDEPENDENT VARIABLES AND THE TOTAL NUMBER OF UNITS COMPLETED BY STUDENT

Variable	1	2	3	4	5
1. Previous Education Level	-	.067	.375	-.139	.351
2. F Scale MMPI		-	-.088	-.164	-.295
3. Number of Prof. Goals			-	.125	.333
4. Satisfaction with Progress				-	-.115
5. Number of Units Completed					

D. SUMMARY OF MULTIPLE REGRESSION ANALYSES WITH TOTAL NUMBER OF UNITS COMPLETED BY STUDENT AS DEPENDENT VARIABLE

	Multiple		Change	
Variable	R	R^2	In R	F
1. Previous Education Level	.351	.123	.123	2.25
2. F Scale MMPI	.430	.185	.061	1.70
3. Number of Prof. Goals	.477	.228	.042	1.38
4. Satisfaction with Progress	.519	.269	.041	1.20

E. INTERCORRELATIONS AMONG THE SELECTED INDEPENDENT VARIABLES AND THE POOLED INSTRUCTORS' RATINGS

Variables	1	2	3	4	5
1. Bennett Mech. Comp.	-	.017	.247	.091	.395
2. Scale 8-MMPI		-	.165	.279	-.212
3. Number of Prof. Goals			-	-.033	.286
4. Scale 5-MMPI				-	-.163
5. Instructors' Ratings					-

F. SUMMARY OF MULTIPLE REGRESSION ANALYSES WITH INSTRUCTORS' RATING AS DEPENDENT VARIABLE

	Multiple		Change	
Variable	R	R^2	In R^2	F
1. Bennett Mech. Comp.	.396	.158	.158	2.99*
2. Scale #8 MMPI	.453	.205	.047	1.94
3. Number of Prof. Goals	.480	.230	.025	1.40
4. Scale #5 MMPI	.501	.251	.020	1.08

G. INTERCORRELATIONS AMONG THE SELECTED INDEPENDENT VARIABLES AND ACHIEVED GRADE POINT AVERAGE

Variable	1	2	3	4	5
1. Previous Education Level	-	.375	-.028	.322	.542
2. Number of Prof. Goals		-	.048	.284	.241
3. Adequacy of Prep.			-	-.046	-.114
4. SCAT - Quant. Score				-	.368
5. Grade Point Average					-

H. SUMMARY OF MULTIPLE REGRESSION ANALYSIS WITH ACHIEVED GRADE POINT AVERAGE AS DEPENDENT VARIABLE

	Multiple		Change	
Variable	R	R^2	In R^2	F
1. Previous Education Level	.542	.292	.292	6.66
2. Number of Prof. Goals	.586	.344	.050	3.93
3. Adequacy of Prep.	.611	.373	.029	2.78
4. SCAT - Quantity	.631	.398	.024	2.14

who expressed altruistic or interest in the type of work tended to be more likely to complete the program. There was a marginally positive correlation between ATDP and successful completion of the program.

Tables IV-C and IV-D contain the findings obtained with the number of units earned as the criterion measure. In this regression model the four independent variables to emerge were: (1) previous educational level (same as the previous model), (2) F scale of the MMPI, (3) number of expressed professional goals, and (4) satisfaction with progress. It should be noted that some of the variables were obtained during or subsequent to the training program and thus the interpretation in a predictive sense must be modified. It is possible to conceive of them as being concomitant variables rather than independent variables or of having occurred prior to the dependent variable. However, these variables (e.g., Nos. 3 and 4 above) are valuable in offering further information pertaining to what attributes are important in successful school performance. To further explain the professional goals variable, subjects were asked to list any goals they may have set for themselves. This variable consisted of the simple frequency of such goals expressed. Variable No. 4 refers to a question asked of the subject as to the degree to which he was satisfied with the progress he had made.

It was found in the analysis that the previous educational level was positively related to the number of units earned ($r = .351$). Thus higher previous educational level was predictive of the number of units earned in the program. The F scale on the MMPI (one of the validity scales purporting to reflect the extent to which the subject was candid and open in responding to the inventory) was negatively related to the number of earned units ($-.295$); thus the lower the score on the F (or more candid the subject was), the more units that were earned. The number of expressed professional goals was also predictive of number of earned units, while the degree of satisfaction with progress was negatively weighted in the prediction model with number of earned units. The latter finding may be indicative of a motivational factor. That is, those subjects being less satisfied would probably have greater motivation to earn more units in such a training program. With respect to the Multiple Regression Model, perusal of Table IV-D reveals only a marginal degree of success in predicting the number of units earned. The R reached .519 after the fourth variable was stepped-in. Thus around 27 percent of the variance in the dependent variable was accounted for by knowing the values taken on by the independent variables. In view of the relatively low F tests, these predictive data, while of some interest, would not be

particularly helpful to those in the field. It should be emphasized that these findings dealt with the data disregarding the school variable. Subsequent analyses of each school will yield different conclusions regarding the dependent variables.

Tables IV-E and IV-F present the results of analyses performed with the pooled instructors' ratings as the dependent variable. With this criterion variable (which was shown to be fairly useful in previous work--see Pedersen and Vash, 1970), the four independent variables stepped-in were: (1) scores on the Bennett Mechanical Comprehension Test, (2) Scale #8 on the MMPI, (3) number of expressed professional goals, and (4) Scale #5 of the MMPI. The Bennett Mechanical Comprehension Test and number of professional goals were positively related to rated performance in school ($r = .395$ and $4 = .286$ respectively), while Scales #8 and #5 on the MMPI were negatively related to instructors' ratings ($r = -.121$ and $r = -.163$ respectively). The multiple regression analyses revealed that the level of prediction was somewhat higher than with the previous dependent variables. The multiple R was .501 with 25 percent of the variance accounted for.

The results obtained from the analyses conducted with earned grade point average as the criterion measure of success are portrayed in Tables IV-G and IV-H. These data indicated, as described earlier, that the GPA's yielded the best criterion measure with respect to the level of prediction afforded by the independent variables. As indicated in the table, the four independent variables were: (1) previous education level, (2) number of professional goals, (3) adequacy of preparation (this was obtained at a later point and therefore its interpretation in the sense of a predictor variable is altered somewhat), and (4) score on the quantitative scale of the School and College Aptitude Test. With regard to the multiple regression model, the independent variables were all found to be significant factors in the dependent variable. The multiple R was .631 (or about 40 percent of the variance in earned grade point average was accounted for by the four independent variables). The prediction equation can be written as follows: predicted grade point average = .289 (previous educational level) + .161 (number of expressed professional goals) - .187 (adequacy of preparation) + .181 (SCAT quant.) + K. In this equation, K (or the constant used in its derivation) is set at .772. In view of the high F tests and the results of the regression analyses, the over-all assessment indicated that GPA is probably the most useful dependent variable to look at.

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Analyses of individual schools: Table V presents the intercorrelations between the stepped-in independent variables and the criterion measures obtained for each school. Table VI portrays the results of the Multiple Regression Analyses conducted with these data. The prediction equations are also presented. In any particular case the criterion measure can be predicted by including an individual's scores into the equation. In the applied situation the necessary level can be specified (e.g., GPA of 2.50) and the individual candidate's values can be included in the equation.

The first dependent variable treated was whether or not the individual completed the program. Table V-A contains the correlation matrices for the four schools, while Table VI-A presents the regression analysis. For Cerritos College, the four independent variables found to be predictive of successful completion of the program were: (1) number of expressed professional goals (i.e., more goals expressed were associated with greater likelihood of completing the program); (2) reasons for entering the field (altruistic reasons and interest in this type of work were predictive of successful completion of the program); (3) size of firm (this was obtained after completion of the program and therefore its interpretation as a predictive variable is unclear); and (4) Scale #4 on the MMPI (this is the scale that assesses the extent to which the person's responses deviate from socially acceptable areas on the Psychopathic-Deviate Scale). The lower scores or scores reflecting socially acceptable trends were found to be predictive of successful completion of the program. Table VI-A indicates that the Multiple R for this analysis reached .670, which can be interpreted as showing that the independent variables account for 45 percent (R^2) of the variance in the dependent variables.

At NYU it will be noted that a different set of independent variables emerged as predictors. Here the variables were: (1) higher level of previous education; (2) higher mechanical reasoning ability as reflected in the Bennett Mechanical Comprehension Test; (3) lower scores on the Scale #5 of the MMPI (or MF, the scale that assesses the appropriateness of the sexual orientation of the individual's interests; lower scores on the MF scale reflect relatively more sexual appropriateness of response); and (4) lower scores on Scale #2 of the MMPI (which is one of the neurotic scales; high scores on Scale D or the depression scale indicate higher degree of neuroticism with a high degree of anxiety). The most important variable or previous education level had an R of .561, was predictive

of over 31 percent of the variance in the dependent variable. The remaining variables combined yielded a multiple R of .896 or accounted for over 80 percent of the variance in the criterion measure. Therefore, knowing an individual's status on these variables will allow considerable precision in prediction of whether he can successfully complete the program at NYU.

The level of prediction with the dependent variable completion of program was found to be somewhat lower at Northwestern (multiple R = .557 or R^2 = .31), possibly reflecting the difference in training programs and proportion of students completing the training regimen. The four variables were: (1) low score on the K scale of the MMPI (this is a validity scale; a high score is interpreted to mean extremely high levels of anxiety); (2) low score on the L scale of the MMPI (which is another validity scale reflecting the truthfulness of responding); (3) high score on the ATDP (favorable attitudes toward disabled individuals); and (4) the Science Scale of the COII.

At UCLA it was found that the most important predictor was whether the individual had attended previous college (multiple R = .695 or over 48 percent of the variance was accounted for). This will be noted to be similar to NYU, which had previous educational level as the most significant predictor variable. The succeeding variables stepped-in were: (1) the Manipulative Scale of the COII; (2) Scale #7 of the MMPI (one of the psychotic scales dealing with schizophrenic type of items--these items are responded positively by the schizophrenically diagnosed individuals--a low score, i.e., relatively more stable, was predictive of more "success"); and (3) computational types of interests as measured by the COII. The multiple R for UCLA was found to be .907. The four variables can account for over 82 percent of the variance in the dependent variable.

A somewhat different set of predictor variables was found to be predictive of "success" when defined in terms of the number of units completed.

For Cerritos the four variables were: (1) previous educational level; (2) number of expressed profession goals; (3) how individual got into field; (4) Scale #4 of the MMPI (lower or more "normal" scores on the Psychopathic Deviate Scale were associated with more earned units). The multiple R was .827 and R^2 was .684. The variables stepped-in with NYU were: (1) verbal score on the COII; (2) attitudes toward disabled persons; (3) F scale of the MMPI (this is a validity scale indicative

of the individual's candor); and (4) whether or not the individual felt his preparation had been adequate. The latter was negatively associated with number of units completed, which may indicate that those who were dissatisfied with their preparation might have been more motivated and thus completed more units in the program. The multiple R for NYU was found to reach .930, which means that over 86 percent of the variability in the dependent variable can be accounted for at NYU by knowing the values taken on by these four predictor variables. Again, data at Northwestern indicated a lower level of accuracy in predicting the criterion measure. The four variables stepped-in were: (1) previous educational level (similar to Cerritos) which had an R of .356; (2) Scale #8 on the MMPI (this is the scale reflecting behavior found in patients diagnosed as being hypomania; a low score or more stability was predictive of success); (3) degree of satisfaction with progress (also a negative association), and (4) type of professional goals. At UCLA, whether the individual attended previous college again emerged as the most important variable. Also stepped-in were reasons for entering field, the L or lie scale on the MMPI (low score correlated with more completed units) and how the individual got into the field (the direction of association indicates that those who were influenced by previous experience or the school rather than the family earned more units).

Perhaps the more valuable dependent variable to use in defining "success" in performance in the program is the instructors' ratings in the three prominent areas (namely, intellectual ability, mechanical aptitude, and emotional stability). Results of the regression analyses reveal that the level of predictability at all of the training sites is relatively high. At Cerritos, the four independent variables stepped-in were: (1) Bennett Mechanical Comprehension Test; (2) number of previous occupations (prior to entry into the program); (3) Scale #5 on the MMPI (this is the paranoia scale; low scores correlated with higher instructors' ratings); and (4) level of interest on the COII (i.e., the degree to which the individual desires to work independently). The multiple R was .693 while R^2 was .480, revealing that 48 percent of the variance was accounted for. At NYU the four variables were found to be: (1) low interest in personal-social types of occupations (negative correlation); (2) high score on the Bennett Mechanical Comprehension Test; (3) low score on Scale #3 of the MMPI (this is a neurotic scale dealing with hysterical types of items; high score means under-concern over bodily function); and (4) type of professional goals (low rating referred to educational-related goals; high rating to business and management types of goals; the negative

correlation reveals that those expressing educational goals were rated higher than those having other goals). The multiple R for NYU was .961 while R^2 was .923. At Northwestern the four variables entered into the equation were: (1) DAT Space Relations Test; (2) Scale #8 of the MMPI (the correlation indicates that those rated higher were more emotionally stable); (3) degree of satisfaction with progress, and (4) reasons for entering field. The multiple R was .672 and R^2 was .452. The DAT Space Relations Test was also the first variable stepped-in at UCLA; also interest in science occupations measured by the COII; most interesting course work (grouped into categories: (a) science and technology, (b) social science, (c) liberal arts, (d) physical education). The negative correlation indicates that those interested in science course work received a higher rating from the instructors. The final variable stepped-in was score on Scale #1 of the MMPI which was also negatively associated with rated performance, indicating a relatively higher degree of personality stability. The multiple R obtained from the sample at UCLA using the instructors' ratings as the criterion measure was .729 while R^2 was .548.

Finally, in terms of school performance, the criterion measure considered was the earned grade point average. In Tables V-D and VI-D it will be seen that each of the schools provided different profiles of what student characteristics or attributes were needed for "success." The four variables stepped-in at Cerritos were: (1) previous education level; (2) low interest in business-type occupations; (3) low score on the F Scale of the MMPI; (4) high performance on the Otis test of mental ability. The multiple R was found to be .732 while R^2 was .537. At NYU, on the other hand, the four variables were: (1) low interest in verbal types of occupational pursuits; (2) low score on the L Scale of the MMPI; (3) types of professional goals; and (4) most interesting course work (with interest in liberal arts being associated with higher grade point averages). The R was .956, which means that over 90 percent of the variance in the criterion measure can be accounted for by these independent variables. At UCLA the four variables were: (1) whether individual attended previous college; (2) performance on the DAT Space Relations Test; (3) type of professional goals, and (4) Scale #7 of the MMPI. The multiple R at UCLA was .899 and R^2 was .809.

These results indicate that a fairly high degree of precision can be attained in predicting "successful" performance in school. Depending upon the way in which such success is defined, only a limited number

TABLE V

INTERCORRELATIONS OF INDEPENDENT VARIABLES AND CRITERION MEASURES FROM SCHOOL PERFORMANCE FOR EACH INSTITUTION

Table Va Whether Subjects Completed Program

1. Cerritos

Variable	1	2	3	4	5
1. No. of prof. goals	--	.188	.037	-.109	.368
2. Reasons for entering field		--	-.254	-.173	-.335
3. Size of firm currently associated with			--	-.021	-.295
4. Scale #4 - MMPI				--	-.232
5. Completed program					--

2. NYU

Variable					
1. Previous ed. level	--	.117	-.286	-.545	.561
2. Bennett Mech. Comprehension		--	.389	-.011	.427
3. Scale #5 MMPI			--	.541	-.378
4. Scale #2 MMPI				--	-.177
5. Completed program					--

3. Northwestern

Variable					
1. K scale - MMPI	--	-.148	-.279	.195	-.600
2. L scale - MMPI		--	.216	.175	-.050
3. ATDP (103)			--	.167	.214
4. Science - COII				--	-.228
5. Completed program					--

4. UCLA

Variable					
1. Attended previous college	--	-.080	.140	.115	.695
2. Manipulation COII		--	.061	-.096	-.327
3. Scale #7 MMPI			--	-.139	.241
4. Computational COII				--	-.332
5. Completed program					--

Table Vb Number of Units Completed

1. Cerritos

Variable	1	2	3	4	5
1. Previous ed. level	--	.375	.139	-.184	.351
2. No. of prof. goals		--	.040	-.140	.333
3. How job opportunity was found			--	.115	.124
4. Scale #4 - MMPI				--	-.208
5. No. of units completed					--

2. NYU

1. Verbal - COII	--	-.489	.041	.190	-.501
2. ATDP		--	-.368	-.382	-.186
3. F scale - MMPI			--	.220	.054
4. Adequacy of preparation				--	-.216
5. No. of units completed					--

3. Northwestern

Variable					
1. Previous ed. level	--	-.237	-.222	.160	.356
2. Scale #8 - MMPI		--	-.002	-.362	-.321
3. Satisfaction with progress			--	-.239	-.270
4. Type of professional goals				--	-.039
5. No. of units completed					--

4. UCLA

Variable					
1. Attended previous college	--	.500	-.062	.500	.631
2. Reasons for entering field		--	-.461	-.864	.443
3. L scale - MMPI			--	.310	-.279
4. How job opportunity was found				--	-.219
5. No. of units completed					--

TABLE V (Cont'd)

INTERCORRELATIONS OF INDEPENDENT VARIABLES AND CRITERION MEASURES FROM SCHOOL PERFORMANCE FOR EACH INSTITUTION

Table 5c Instructors' Pooled Ratings

Variable	1	2	3	4	5
1. Cerritos					
1. Bennett Mech. Comprehension	--	.203	.183	.190	.502
2. No. of previous occupations		--	.112	.058	.384
3. Scale #5 MMPI			--	-.031	-.176
4. Level of interest COII				--	.357
5. Pooled Instructors' Ratings					--
2. NYU					
1. COII Per-Soc	--	-.139	-.056	.116	-.648
2. Bennett Mech. Comprehension		--	.406	-.175	.610
3. Scale #3 MMPI			--	.589	-.015
4. Type of professional goals				--	-.117
5. Pooled Instructors' Ratings					--
3. Northwestern					
1. DAT-Space relations	--	-.125	.295	-.034	.524
2. Scale #8 MMPI		--	-.003	.038	-.318
3. Satisfaction with progress			--	.216	.389
4. Reasons for entering field				--	-.180
5. Pooled Instructors' Ratings					--
4. UCLA					
1. DAT-space relations	--	.278	-.082	-.493	.383
2. Science - COII		--	-.299	-.336	-.288
3. Most interesting courses in school			--	.073	-.319
4. Scale #1 MMPI				--	-.307
5. Pooled Instructors' Ratings					--

Table 5d Grade Point Average

Variable	1	2	3	4	5
1. Cerritos					
1. Previous ed. level	--	-.166	-.256	.285	.558
2. Bus.-det. COII		--	-.097	.010	-.392
3. F scale - MMPI			--	-.113	-.351
4. Otis - Intelligence				--	.392
5. GPA					--
2. NYU					
1. Verbal - COII	--	.156	-.333	-.135	-.541
2. L scale - MMPI		--	.307	-.017	-.481
3. Type of professional goals			--	.745	.458
4. Most interesting courses taken				--	.188
5. GPA					--
3. Northwestern					
1. SCAT - quant.	--	-.042	.205	-.080	.496
2. Satisfaction with progress		--	-.222	-.200	.430
3. Previous ed. level			--	.344	.389
4. How individual got into field				--	-.187
5. GPA					--
4. UCLA					
1. Attended previous college	--	.113	.500	.140	.542
2. DAT space relations		--	.096	-.233	.535
3. Types of professional goals			--	-.634	-.314
4. Scale #7 MMPI				--	-.112
5. GPA					--

TABLE VI

RESULTS FROM MULTIPLE REGRESSION ANALYSES CONDUCTED WITH CRITERION MEASURES FROM SCHOOL PERFORMANCE

Table VIa Whether Completed Program

Variable	Multiple R	R^2	Change in R^2	F
1. Cerritos				
1. No. of goals	.367	.135	.135	3.764
2. Reasons for entering field	.480	.231	.095	3.796
3. Size of firm	.629	.396	.165	3.187
4. Scale #4 MMPI	.670	.450	.054	1.072
2. NYU				
1. Previous ed. level	.561	.315	.315	5.611
2. Bennett Mech. comprehension	.669	.447	.133	8.824
3. Scale #5 MMPI	.798	.637	.189	8.621
4. Scale #2 MMPI	.896	.803	.165	4.224
3. Northwestern				
1. K scale MMPI	.336	.113	.113	2.835
2. L scale MMPI	.448	.201	.087	1.686
3. ATDP	.506	.256	.055	1.312
4. Science scale COII	.557	.309	.054	1.021
4. UCLA				
1. Previous college	.695	.483	.483	24.254
2. Manipulative COII	.794	.629	.147	8.236
3. Scale #7 MMPI	.876	.768	.138	4.981
4. Computational COII	.907	.823	.055	2.489

Table VIb Number of Units Completed

Variable	Multiple R	R^2	Change in R^2	f
1. Cerritos				
1. Previous ed. level	.711	.506	.506	8.966
2. No. of professional goals	.773	.597	.092	2.577
3. How got into field	.809	.655	.058	1.670
4. Scale #4 MMPI	.827	.684	.028	0.984
2. NYU				
1. Verbal COII	.501	.251	.251	14.273
2. ATDP	.704	.495	.244	19.157
3. F scale MMPI	.849	.720	.224	10.247
4. Adequacy of preparation	.930	.866	.145	5.418
3. Northwestern				
1. Previous ed. level	.356	.126	.126	1.046
2. Scale #8 MMPI	.431	.186	.059	1.979
3. Satisfaction with progress	.480	.230	.044	1.300
4. Type of professional goals	.541	.293	.062	1.148
4. UCLA				
1. Attended previous college	.633	.399	.399	922.071
2. Reasons for entering field	.771	.595	.196	621.296
3. L scale MMPI	.967	.936	.341	780.433
4. How got into field	.998	.996	.060	121.565

TABLE VI (cont'd)

RESULTS FROM MULTIPLE REGRESSION ANALYSES CONDUCTED WITH CRITERION MEASURES FROM SCHOOL PERFORMANCE

Table VIc Instructors' Pooled Ratings

Variable	Multiple R	R^2	Change in R^2	F
1. Cerritos				
1. Bennett Mech. Comprehension	.502	.252	.252	4.728
2. Number of previous occupations	.579	.335	.083	3.280
3. Scale #5 MMPI	.650	.423	.087	2.933
4. Level of interest COII	.693	.480	.057	2.547
2. NYU				
1. Pers.-Soc. COII	.648	.420	.420	5.798
2. Bennett Mech. Comprehension	.834	.695	.275	8.007
3. Scale #3 MMPI	.883	.779	.083	7.043
4. Type of professional goals	.961	.923	.144	14.958
3. Northwestern				
1. DAT space relations	.524	.274	.275	6.059
2. Scale #8 MMPI	.582	.339	.064	3.849
3. Satisfaction with progress	.635	.403	.064	3.161
4. Reasons for entering field	.672	.452	.048	2.682
4. UCLA				
1. DAT space relations	.382	.146	.146	1.885
2. Science COII	.549	.302	.155	2.165
3. Most interesting course work	.692	.479	.177	2.765
4. Scale #1 MMPI	.739	.548	.067	2.420

Table VId Grade Point Average

Variable	Multiple R	R^2	Change in R^2	F
1. Cerritos				
1. Previous ed. level	.558	.311	.311	6.330
2. Business-det. COII	.635	.404	.092	4.404
3. F scale MMPI	.688	.473	.069	3.595
4. Otis mental abilities	.732	.537	.063	3.192
2. NYU				
1. Verbal COII	.541	.293	.293	3.313
2. L scale MMPI	.674	.454	.161	2.916
3. Type of professional goals	.831	.691	.237	4.476
4. Most interesting course work	.956	.913	.222	13.167
3. Northwestern				
1. SCAT - quant.	.495	.245	.245	5.209
2. Satisfaction with progress	.643	.413	.167	5.276
3. Previous ed. level	.757	.573	.160	6.272
4. How got into field	.787	.620	.047	5.311
4. UCLA				
1. Attended previous college	.542	.293	.293	4.576
2. DAT-space relations	.722	.521	.227	5.445
3. Type of professional goals	.808	.653	.131	5.634
4. Scale #7 MMPI	.899	.809	.156	8.471

TABLE VIe

PREDICTION EQUATIONS FOR SCHOOL PERFORMANCE CRITERIA FROM EACH OF THE INSTITUTIONS

Whether Subject Completed Program

INSTITUTION	
Cerritos:	Predicted = .313 (Number of professional goals) - .162 (Reasons for entering O-P) - .296 (Size of firm) - .013 (MMPI scale #4) + 2.338
NYU:	Predicted = .117 (Previous education level) + .006 (Bennett mech.) + .018 (Scale #5 MMPI) -.017 (Scale #2 MMPI) + .325
Northwestern:	Predicted = -.019 (K scale, MMPI) - .020 (L scale, MMPI) + .007 (ATDP) - .003 (Science scale COII) + .056
UCLA:	Predicted = .726 (Attended previous college) - .008 (Manipulative COII) - .012 (Scale #7 MMPI) - .002 (Computational, COII) + 2.236

Number of Units Completed

Cerritos:	Predicted = 16.104 (Previous education level) + 13.58 (Number of professional goals) + 5.446 (How individual got into field) - .622 (completed program) - 154.50
NYU:	Predicted = -.230 (Verbal-COII) - .285 (ATDP) - .583 (F scale, MMPI) - 8.06 (Adequacy of preparation) + 119.31
Northwestern:	Predicted = 4.617 (Previous educational level) - .620 (Scale #8, MMPI) - 14.357 (Satisfaction with progress) - 11.781 (Type of professional goals) + 63.098
UCLA:	Predicted = 41.452 (Attended previous college) + 14.482 (Reasons for entering field) + 1.476 (L scale, MMPI) + 6.069 (How individual got into field) - 146.356

Instructors' Pooled Ratings

Cerritos:	Predicted = .052 (Bennett mech.) + .927 (Previous occupational positions) - .089 (Scale #5, MMPI) + .026 (COII, Level of Interest) + 9.922
NYU:	Predicted = -.046 (Pers.-social, COII) + .085 (Bennett mechanical comprehension test) - .191 (Scale #3, MMPI) + 2.308 (Type of professional goals) + 16.809
Northwestern:	Predicted = .524 (DAT, space relations) - .061 (Scale #8, MMPI) + 2.251 (satisfaction with progress) - .414 (Reason for entering field) + 9.113
UCLA:	Predicted = .042 (DAT, space relations) - .058 (Science, COII) - 2.562 (Most interesting course work) - .109 (Scale #1, MMPI) + 19.598

Grade Point Average

Cerritos:	Predicted = .277 (Previous education level) - .014 (Business-detail, COII) - .038 (F Scale, MMPI), + .010 (Otis test of mental ability) - .056
NYU:	Predicted = -.001 (Verbal, COII) - .052 (J Scale, MMPI) + 1.258 (Type of professional goals) - .791 (Interesting course work) + 4.732
Northwestern:	Predicted = .010 (SCAT, Quant.) + .800 (Satisfaction with progress) + .302 (Previous educational level) - .145 (How got into field) - 3.564
UCLA:	Predicted = 1.864 (Attended previous college) + .015 (DAT, space relations) - 1.134 (Type of professional goals) - .064 (Scale #7, MMPI)

of attributes are needed to characterize the successful orthotic-prosthetic student. Such information would have considerable implications for those involved in the training programs. However, for more useful applications it would be important to know how accurate one can be in predicting performance after completion of the training program; that is, how "successful" will the former students be in fulfilling their roles in the professional community. This is the more critical prediction question to be addressed next in the consideration of results from the study.

(3) Predictive Findings - Postgraduate Performance

Follow-up procedures were implemented during the second year and conducted through the final three years of the study. Specifically, as students completed their programs, research aides at each of the institutions contacted them and determined their employment status and current addresses. The subject completed the employment inventory and provided information relating to his employment. This information was then obtained at six-month intervals during the succeeding phase of the study. At the same times, the employers were contacted for the purpose of obtaining information relevant to the former students' performance on the job, including specification of job responsibilities and rating of job performance. These data were also obtained at six-month intervals.

In some cases difficulties were encountered in locating and obtaining information from former students. In these instances a variety of supplementary sources were employed. The school's past records were reviewed, former associates of the student were contacted for possible information, parents or close relatives were located and queries relative to current addresses; the Orthotic-Prosthetic Association's directory also proved helpful in some cases to provide clues as to the whereabouts of relatives or friends active in the field. This combination of sources proved to be most effective in locating the former students. The following discussion will indicate the numbers of students followed up and will describe some of the more salient attributes of the employed group of students who were included in the follow-up. This will be succeeded by a consideration of the regression models used to assess the level of prediction attained by the independent variables.

Selection of Students for Orthotic-Prosthetic Educational Programs

Illustrative data indicating the characteristics of the students who were followed up and included in the sample are shown in Table VII.

Review of the information in Table 6 indicates that a relatively high percentage of the sample was included in the follow-up data (71 percent from Cerritos, 90 percent from NYU, 88 percent from NW and 93 percent from UCLA). Furthermore, of these subjects, most were employed in orthotics-prosthetics, which would probably be expected since those who have "dropped out" of the field prior to graduation would probably not be extremely responsive to such a follow-up. The lower percentages obtained from Cerritos and Northwestern may be attributed to the type of school (i.e., community college versus four-year program) and that younger and less mature students would be likely to enter these programs and thus "drop out" earlier than the other schools. In general, the follow-up data are encouraging and are sufficient to conduct meaningful predictive analyses of postgraduate performance.

The criterion measures used to define postgraduate "success" were: (1) number of rewarding aspects of the job; (2) starting salary; (3) length of employment; (4) length of time at current position; and (5) employers' ratings of job performance (pooled over each year). Due to the limited time of follow-up and the fact that some of the students had just completed training, the measures pertaining to length of employment were thought to be somewhat biased. The starting salary, in view of geographical and economic differences and different levels of background, was also deemed to be an inappropriate criterion measure of "success." The following discussion will therefore focus upon the number of rewarding aspects of the job listed by the subject (which should definitely reflect differential levels of success) and employers' ratings of job performance, which should also be a relatively meaningful measure of "success." The remaining models are presented in Appendices D, E, and F.

Over-all analyses: Tables VIII and IX contain the intercorrelation matrices and regression analyses conducted with these criteria for all schools.

The Number of Rewarding Aspects was obtained by asking each of the subjects to list those things that were most satisfying or rewarding about his job. In addition, these were classified in terms of the type of rewarding aspects (pay, security, types of tasks, independence, and altruistic). In terms of the analyses performed with the Number of Rewarding Aspects, which can be conceived of as being an indicant of job satisfaction,

TABLE VII

Summary of Follow-up Data

Variable	Institution			
	Cerritos	NYU	NWU	UCLA
Number followed up	60	20	62	30
Proportion of sample	.71	.90	.88	.93
Number of subjects working in O-P field	56	18	55	27
Average starting salary	$6,600	$7,200	$6,500	$7,500

TABLE VIII

SUMMARY OF INTERCORRELATIONS OF INDEPENDENT VARIABLES AND CRITERION MEASURES OF POST-GRADUATE "SUCCESS"

Table VIIIa Intercorrelations of Independent Variables and Numbers of Rewarding Aspects of Job

Variable	1	2	3	4	5
1. No. of expressed professional goals	--	-.035	-.142	-.226	.549
2. Type of goals		--	-.106	-.124	.090
3. Adequacy of preparation			--	-.073	.048
4. Size of firm				--	.120
5. No. of rewarding aspects					--

Table VIIIb Intercorrelations of Independent Variables and Pooled Employers' Ratings

Variable	1	2	3	4	5
1. SCAT - quant.		.285	-.007	.202	.353
2. No. of professional goals		--	-.027	.134	.352
3. COII - level of interest			--	.012	.177
4. Reasons for entering field				--	.255
5. Pooled employers' ratings					--

TABLE IX

RESULTS FROM MULTIPLE REGRESSION ANALYSES CONDUCTED WITH POST-GRADUATION PERFORMANCE MEASURES

Table IXa Number of Rewarding Aspects

Variable	Multiple R	R^2	Change in R^2	F
1. No. of professional goals	.549	.302	.302	6.913
2. Type of goals	.6229	.388	.086	4.756
3. Adequacy of preparation	.652	.425	.037	3.454
4. Size of firm	.669	.448	.022	2.641

Prediction equation: No. of rewarding aspects' = 1.11 (no. of goals) - .48 (type of goals) - .71 (adequacy of preparation) - .31 (size of firm) + 4.01

Table IXb Employers' Rating

Variable	Multiple R	R^2	Change in R^2	F
1. SCAT - quant.	.353	.125	.125	2.28
2. No. of professional goals	.440	.193	.069	1.80
3. COII level of interest	.478	.228	.035	1.38
4. Reasons for entering field	.505	.255	.026	1.17

Prediction equation: Employers' rating' = .069 (SCAT quant.) + 2.168 (No. of goals) + .055 (COII level of interest) + .741 (reasons for entering field) + 18.108

the four independent variables were: (1) number of professional goals, (2) type of professional goals, (3) adequacy of preparation, and (4) size of firm (which was obtained at the time of follow-up; the r showed that the larger the hiring firm, the more the job satisfaction). The multiple R was .669, which indicates that about 45 percent of variance in the criterion measure was accounted for by the independent variables. The prediction equation is also presented in Table IX-A.

The former student's performance in fulfilling his job responsibilities was also rated on a four-point scale by the subject's employer (i.e., 4 = outstanding, 3 = good, 2 = fair, 1 = poor). The results of the analyses conducted with the employers' ratings are also contained in Table IX. The four independent variables that were stepped-in were: (1) SCAT-Quant. (higher score on Quantitative Abilities was predictive of higher rated performance); (2) number of professional goals; (3) California Occupational Interest Inventory - Level of Interest (i.e., those receiving higher ratings had more interest in working independently and were generally more mature); and (4) reasons for entering field (those who entered due to interest in the type of work generally received higher ratings than those who entered for altruistic reasons). The multiple R was .505, which indicates that slightly more than 25 percent of the variance was accounted for by the predictors.

Analyses conducted with individual schools: Tables X and XI contain the intercorrelations among the independent variables and criterion measures, and the results obtained from the multiple regression analyses for each of the participating institutions.

Review of the analyses performed with the criterion measure, the number of rewarding aspects of employment in orthotics-prosthetics, indicates that the four independent variables to emerge with Cerritos were: (1) number of expressed professional goals; (2) type of rewards (high coding referred to altruistic type rewards; low coding referred to pay and security type of rewards); (3) adequacy of preparation (rating); and (4) Bennett Mechanical Comprehension Test. According to the simple correlations with the dependent variable, the more goals that were expressed, the more rewarding aspects found on the job. With regard to the type of rewards, the negative r (-.451) with number of rewarding aspects indicates that those expressing altruistic rewards found fewer rewarding aspects in orthotics-prosthetics employment than those expressing financial or security type rewards. It also was found that those expressing

dissatisfaction with the adequacy of their preparation had found more rewarding aspects of orthotic-prosthetic employment. Results with the Bennett Mechanical Comprehension Test indicate that higher scores were predictive of more job satisfaction than lower scores. For Cerritos, the results of the regression analysis yielded a multiple R of .843 with R^2 .711. Over 70 percent of the variability in the criterion measure can be accounted for by these four predictor variables.

At NYU, Table X indicates that somewhat different attributes proved to be predictive of job satisfaction, specifically: (1) numbers of previous occupational positions (as enumerated on the biographical data sheet completed at the beginning of the program); (2) low score on the L Scale of the MMPI (lie scale); (3) low score on Scale #1 of the MMPI (the scale dealing with hypochondriasis); and (4) smaller firms. The multiple R for NYU was .909 with an R^2 of .826. This represents an extremely high level of predictability.

Data from Northwestern reveals that job satisfaction (as defined by the number of expressed rewarding aspects of orthotic-prosthetic employment) can also be predicted with a relatively high degree of precision. The four predictor variables stepped-in to the equation were: (1) number of professional goals; (2) how individual got into field (direction of simple correlation indicates that those who entered through a relative or teacher influence obtained more satisfaction than those who learned of opportunity through school placement or individual job hunt); (3) low score on K Scale of MMPI (validity scale indicating degree of candor in responding); and (4) type of previous work (those having previous O-P or related types of jobs prior to the program found more rewarding aspects). The multiple R from Northwestern was .828 with R^2 attaining .685. It will be noted that the data from Northwestern was quite similar to Cerritos in this regard.

Data from UCLA indicate that the number of rewarding aspects expressed are predicted by somewhat different independent variables. They are: (1) SCAT - Total Score (adds 32 percent to the prediction); (2) interest in art types of occupations (COII); (3) satisfaction with progress after graduation; and (4) low scores on Scale #2 of the MMPI. For UCLA, the multiple R was .842 and R^2 was .709.

The Pooled Employers' Ratings were also used in the regression analyses. Tables X-B and XI-B contain the results from each of the schools.

Selection of Students for Orthotic-Prosthetic
Educational Programs

At Cerritos the four predictor variables were found to be: (1) previous educational level; (2) reasons for entering the field; (3) type of previous work (related mechanical jobs were associated with higher ratings); and (4) type of professional goals (business and professional goals were coded higher and were correlated with higher employers' ratings). The multiple R from Cerritos was .772, while R^2 was found to be .596.

At NYU the employers' ratings were predicted by the following: (1) previous educational level (higher levels were predictive of higher ratings); (2) low scores on Scale #8 of MMPI; (3) smaller firms; and (4) low interest in business type occupations on the COII. The multiple R for NYU was .953, an extremely high level of predictability.

The regression analyses performed with data from Northwestern shows that employers' ratings can be predicted by: (1) performance on the DAT Space Relations; (2) reasons for entering field (direction of simple r indicates altruistic reasons or lower coded items were related to higher employers' ratings); (3) low scores on the F Scale of the MMPI; and (4) low scores on Scale #7 of the MMPI. The multiple R yielded by the analyses was .771, which means approximately 60 percent of the variance in employers' ratings can be predicted by the four independent variables stepped-in to the equation.

The four variables at UCLA stepped-in to the equation were: (1) Otis test of mental ability (higher intelligence scores were correlated with higher employers' ratings); (2) low scores on the F Scale of the MMPI; (3) low interest in mechanical occupations as measured by the COII; and (4) low scores on the K Scale of the MMPI. It is clear from the results that a high degree of predictability is afforded by the independent variables. The multiple R was .899 or over 80 percent of the variation can be predicted by the independent variables.

In general, the results from the previous analyses are more than encouraging. It would seem that accurate prediction in the realm of school success and postgraduate performance can indeed be accomplished. However, as indicated previously, it is much more critical, in terms of level of attained professionalism, to demonstrate the capability to predict the ability to become certified as an orthotist or prosthetist. The next section will deal with the data that are available relevant to the issue of predicting eventual certification.

TABLE X

INTERCORRELATIONS OF INDEPENDENT VARIABLES AND CRITERION MEASURES FROM POST-GRADUATE PERFORMANCE FOR EACH INSTITUTION

Table Xa Number of Rewarding Aspects (Job Satisfaction)

Variable	1	2	3	4	5
1. Cerritos					
1. No. of professional goals	--	.189	.010	.385	.511
2. Type of rewards		--	.041	-.001	-.451
3. Adequacy of preparation			--	-.157	-.306
4. Bennett Mech. Comprehension				--	-.06
5. No. of rewarding aspects					--
2. NYU					
1. Previous occupation positions	--	.084	.200	.220	.493
2. L scale MMPI		--	.117	.154	-.491
3. Scale #1 MMPI			--	.171	-.469
4. Size of firm				--	-.289
5. No. of rewarding aspects					--
3. Northwestern					
1. No. of professional goals	--	.124	.213	-.187	.696
2. How got into field		--	.140	-.080	-.417
3. K scale MMPI			--	.016	-.359
4. Type of previous work				--	-.299
5. No. of rewarding aspects					--
4. UCLA					
1. SCAT total score	--	-.095	-.272	-.412	.573
2. COII art		--	.393	.286	-.470
3. Satisfaction with progress			--	-.589	.019
4. Scale #2 MMPI				--	-.200
5. No. of rewarding aspects					--

Table 10b Employers' Ratings

Variable	1	2	3	4	5
1. Cerritos					
1. Previous ed. level	--	.099	.044	-.288	.410
2. Reasons for entering field		--	-.321	-.027	.430
3. Type of previous work			--	.343	.265
4. Type of professional goals				--	-.274
5. Employers' ratings					--
2. NYU					
1. Previous ed. level (7)	--	-.542	.010	.067	.491
2. #8 MMPI (101)		--	.591	.330	-.200
3. Size of firm (138)			--	-.111	-.157
4. COII - bus. (84)				--	-.132
5. Employers' ratings					--
3. Northwestern					
1. DAT space relations	--	-.034	-.112	-.100	.507
2. Reasons for entering field		--	-.138	.118	.279
3. F scale MMPI			--	.567	-.215
4. Scale #7 MMPI				--	-.135
5. Employers' ratings					--
4. UCLA					
1. Otis mental abilities (78)	--	-.126	.242	.095	.656
2. F scale MMPI (92)		--	.032	-.105	-.465
3. Mech.-COII			--	.137	-.186
4. K scale MMPI (93)				--	-.398
5. Employers' ratings					--

TABLE XI

RESULTS OF REGRESSION ANALYSES CONDUCTED WITH CRITERION MEASURES FROM POST-GRADUATE PERFORMANCE

Table XIa Number of Rewarding Aspects

Variable	Multiple R	R^2	Change in R^2	F
1. Cerritos				
1. No. of professional goals	.511	.261	.261	4.956
2. Type of rewards	.756	.572	.311	8.719
3. Adequacy of preparation	.807	.653	.079	7.517
4. Bennett Mech. Comprehension	.843	.711	.058	6.775
Prediction equation: No. of rewarding aspects' = 1.36 (No. of goals) - .637 (type of work) - 1.185 (adequacy of preparation) - .016 (Bennett) + 5.084				
2. NYU				
1. Previously occupied positions	.493	.243	.243	2.580
2. L scale MMPI	.728	.530	.286	3.951
3. Scale #1 MMPI	.847	.718	.188	5.102
4. Size of firm	.909	.826	.108	5.957
Prediction equation: No. of rewarding aspects' = .936 (previously occupied occupations) - .121 (L scale MMPI) - .096 (Scale #1 MMPI) - .739 (size of firm) + 2.33				
3. Northwestern				
1. No. of professional goals	.695	.484	.484	15.01
2. How got into field	.760	.578	.093	10.267
3. K scale MMPI	.801	.642	.064	8.390
4. Type of previous work	.828	.685	.042	7.083
Prediction equation: No. of rewarding aspects' = 1.365 (No. of goals) - .496 (How got into field) - .046 (K scale MMPI) - .372 (type of previous work) + .199				
4. UCLA				
1. SCAT - total	.573	.328	.328	5.384
2. COII - art	.709	.503	.174	5.060
3. Satisfaction with progress	.800	.640	.137	5.348
4. Scale #2 MMPI	.842	.709	.069	4.893
Prediction equation: No. of rewarding aspects' = .034 (SCAT total) - .036 (COII art) + 2.153 (satisfaction with progress) - .079 (scale #2 MMPI) - 7.038				

Table XIb Pooled Employers' Ratings

Variable	Multiple R	R^2	Change in R^2	F
1. Cerritos				
1. Previous ed. level	.483	.233	.233	4.273
2. Reasons for entering field	.648	.419	.186	4.706
3. Type of previous work	.721	.519	.099	4.329
4. Type of professional goals	.772	.596	.076	4.061
Prediction equation: Y' = 4.41 (previous ed. level) + 3.33 (reasons for entering field) + 6.237 (type of previous work) - 6.565 (type of professional goals) + 8.529				
2. NYU				
1. Previous ed. level	.491	.241	.241	2.541
2. #8 MMPI	.741	.550	.309	4.280
3. Size of firm	.811	.658	.108	3.855
4. COII - bus.	.953	.909	.250	12.543
Prediction equation: Y' = 10.456 (previous ed. level) - 1.466 (Scale #8 MMPI) + 8.33 (size of firm) + .235 (COII-bus.) + 168.186				
3. Northwestern				
1. DAT space relation	.507	.257	.257	5.555
2. Reasons for entering O-P	.588	.346	.088	3.971
3. F scale MMPI	.670	.449	.102	3.803
4. Scale #7 MMPI	.771	.595	.146	4.787
Prediction equation: Y' = .115 (DAT space relations) + 1.588 (reasons for entering O-P) - .406 (F scale MMPI) - .254 (scale #7 MMPI) + 11.747				
4. UCLA				
1. Otis mental abilities	.656	.430	.430	8.325
2. F scale MMPI	.761	.579	.148	6.889
3. Mech. COII	.830	.689	.109	6.656
4. K scale MMPI	.899	.809	.120	8.493
Prediction equation: Y' = .143 (Otis) - .409 (F scale) - .06 (Mech. COII) - .195 (K scale MMPI) + 32.814				

(4) Predictive Findings - Certification Test Results

Table XII contains the multiple regression analysis conducted with the certification test results. In view of the fact that only a limited number of the original sample were eligible for certification within the time period of the study, the analyses will only deal with the over-all data. Subsequent work will have to address itself to the question of the possible interaction between training site and certification success.

Review of the data presented in the tables indicates that the factors contributing most significantly to prediction of the certification test scores were: (1) lower scores on business interest scale as measured by the COII; (2) whether the subject had held previous supervisorial positions (i.e., those having held such positions scored relatively higher on the certification score); (3) those scoring lower on the #8 Scale of the MMPI (more personality stability) with more success on the certification test; and (4) two most rewarding aspects of employment in orthotics-prosthetics. The latter variable requires some additional explanation. Specifically, subjects were asked to indicate the two most rewarding aspects of their employment. These were categorized according to the following scheme: (1) pay (low code); (2) security (next higher code); (3) tasks performed; (4) independence; and (5) altruistic. The positive correlation indicates that those expressing altruistic rewards and desire for independence scored higher on the certification test. Each of the predictor variables yielded significant F scores and thus were reliably associated with level of performance on the certification test. The multiple R was .765, which can be interpreted as meaning that over 58 percent (R^2) of the variance in the certification scores can be accounted for by knowing the values of the independent variables.

Table XIII contains a summary of the correlations obtained between the school performance variables and the certification test scores. These data can be interpreted as being a validation of the training programs in that they show the extent to which information imparted by the programs is preparing students for certification.

It would seem safe to conclude from these data that previous experience in the training programs is correlated to some degree with relative success in the certification exam. This should provide partial evidence for the validity of the training programs.

Table XIIa Intercorrelations between Independent Variables and Certification Test Results

Variable	1	2	3	4	5
1. COII-bus. detail (84)	--	.110	-.009	-.114	-.531
2. Held previous supervisorial positions (27)		--	-.149	-.035	.300
3. Scale #8 MMPI (101)			--	.080	-.254
4. Two most rewarding aspects of employment (148)				--	.353
5. Certification test results (185)					--

Table XIIb Results of Multiple Regression Analyses Conducted with Independent Variables and Certification Test Results as the Criterion Measure

Variable	Multiple R	R^2	Change in R^2	F
1. COII-bus. detail	.531	.283	.283	6.306
2. Held previous supervisorial positions	.643	.413	.130	5.280
3. Scale 8 MMPI	.712	.507	.094	4.809
4. Two most rewarding aspects of employment	.765	.585	.078	4.596

Prediction equation: Cert. score[1] = -.149 (Bus. detail) + 5.923 (held supervisorial positions) -.186 (Scale 8 MMPI) + 1.76 (two most rewarding aspects of employment) + 56.33

TABLE XIII

Intercorrelations Among School Performance Measures and Certification Test Scores

		1	2	3	4
1.	GPA	--	.426	.501	.607
2.	Number of earned units		--	.259	-.160
3.	Instructors' ratings			--	.250
4.	Certification test				--

Selection of Students for Orthotic-Prosthetic Educational Programs

Psychometric Results

Table XIV presents a summary of the relationships obtained between the psychometric evaluation instruments and the school performance variables. These data are provided in an effort to portray an overview of the association between test performance and "success" in school as indicated by earned grade point average and the instructors' ratings. As can be seen, the measures are moderately correlated with "success" in school; however, previous data that have been considered indicated that other demographic variables and items pertaining to previous experiences yielded more accurate predictions. For the purposes of application in the academic setting, the following table and normative data contained in Table III should be of some value. For predicted "success," one would determine if an individual's scores are above the sample mean for the intellectual and mechanical aptitude measures (the Otis and SCAT, especially Quantitative Scale, Bennett Mechanical Comprehension Test, and Space Relations of the DAT) at Cerritos College, Northwestern, and UCLA. At NYU the Intellectual and Academic Aptitude measures were not as discriminating; however, the Mechanical Aptitude tests were. At NYU, factors related to school performance were the Bennett Mechanical Comprehension and DAT Space Relations. Reference to these tables will indicate in any particular set of scores how they compare to the sample from that school.

TABLE XIV

SUMMARY OF CORRELATIONS BETWEEN THE TEST BATTERY AND CRITERION MEASURES FOR EACH SCHOOL

Measure	INSTITUTION							
	Cerritos		NYU		Northwestern		UCLA	
	Over-all G.P.A.	Instructors' Ratings	Over-all G.P.A.	Instructors' Ratings	Over-all G.P.A.	Instructors' Ratings	Over-all G.P.A.	Instructors' Ratings
SCAT								
1. Verbal	.375	.419	-.179	-.155	.160	-.061	.232	.361
2. Quant.	.256	.304	-.047	-.080	.495	.264	.352	.256
3. Total	.319	.435	-.111	-.123	.383	.101	.337	.326
OTIS: Intelligence	.392	.366	.165	.062	.407	.292	.100	.344
Bennett Mech.	.338	.502	.417	.610	.266	.253	.125	.191
DAT Space Relations	.206	.187	.462	.256	.431	.524	.535	.382
COII								
Per.-Soc.	.170	.142	-.138	-.648	-.106	-.062	.072	.081
Nature	.227	.120	.210	.205	.036	-.014	.094	.079
Mech.	-.019	.053	.385	.191	.048	.072	.072	-.159
Bus. det.	-.392	-.255	-.532	-.119	.155	.029	.120	.179
Art	.035	-.051	-.323	-.297	-.172	-.106	-.144	.103
Science	-.197	-.056	.407	-.198	-.008	.001	.179	-.287
Verbal	.025	-.096	-.541	-.541	-.021	-.026	-.077	-.144
Manipulative	-.272	-.152	-.309	-.398	-.065	-.006	.250	.171
Quant.	-.367	-.183	-.373	.063	.255	.104	.260	.059
Level of Interest	.189	.357	.109	.324	-.192	-.185	-.295	-.184
MMPI								
L	-.078	-.219	-.481	-.440	-.050	.064	.212	-.009
F	-.352	-.148	-.125	.184	-.211	-.200	-.136	-.156
K	.228	-.019	-.207	-.223	.180	.155	.065	-.010
Hs	-.065	-.084	-.049	-.097	-.129	-.125	-.349	-.306
D	-.209	-.238	-.152	-.345	-.099	-.148	-.249	-.160
Hy	.008	-.116	.105	-.015	-.194	-.138	-.280	-.254
Pd	-.153	-.224	.079	-.146	-.192	-.264	-.054	.096
Mf	-.205	-.176	-.023	-.002	-.236	-.293	-.017	.125
Pa	-.083	-.125	-.058	-.055	-.259	-.271	-.082	-.078
Sc	-.094	-.211	-.333	-.447	-.326	-.253	-.112	-.081
Ma	-.173	-.181	-.252	-.322	-.270	-.318	-.332	-.070
Pt	-.068	-.115	-.210	-.228	-.307	-.237	-.068	-.066

DISCUSSION AND IMPLICATIONS

The findings described in the earlier section have clearly shown that a high degree of accuracy can be achieved in prediction of performance in orthotic-prosthetic training programs and "success" in post-graduation endeavors. Two general observations would appear warranted. The first is that each educational institution apparently demands different sets of attributes or patterns of abilities on the part of their students. The second observation is that abilities and characteristics needed for success in post-graduation performance may not be the same as those needed to complete the training curricula. The disparity noted here may or may not be significant; further evidence with longer follow-up and more valid criteria would be needed to determine if this reflects a significant difference.

The predictors that emerged as the most important factors, or at least appeared in most of the prediction models dealing with measures of school performance, were: (1) level of previous education (individuals having more extensive educational backgrounds will have greater likelihood of successfully completing the program. It is noteworthy that this has been found in numerous other academic prediction studies); (2) the number of Expressed Professional Goals (the more goals a person has set for himself, the more motivation he will possess and therefore the more "success" he should achieve); (3) Mechanical Aptitude (both the Bennett Mechanical Comprehension and the DAT Space Relations tests); and (4) most interesting course work in school (with science and technology courses as being associated with higher levels of attained success). However, careful attention must be addressed to the differences observed across schools. Performance in the intellectual and academic aptitude tests were relatively more important at Cerritos and Northwestern than at NYU or UCLA. This is probably due to the fact that NYU and UCLA, as a consequence of the nature of their programs, have a group of students that are more homogenous and perform at higher levels on these measures. Therefore these measures would not be sensitive in measuring individual differences. On the other hand, the measures of mechanical abilities seemed to be relatively more important at NYU and Northwestern.

In general, post-graduation success was predicted by those variables reflecting differences in motivation. For example, Types of Rewards

and Reasons for Entering the Field emerged as fairly important predictors. The psychometric instruments were not found to be particularly significant in predicting "success." In terms of success in certification, the following variables were found to be important: (1) lower interest in business types of occupations on the COII; (2) whether the person had held previous supervisorial positions (which may be conceived as a measure of maturity and leadership experience); (3) low score on Scale #8 or the Ma scale of the MMPI; and (4) Number of Rewarding Aspects of orthotic-prosthetics (greater number of aspects found to be rewarding were associated with higher scores and more success in certification; this again may be interpreted in terms of enhanced levels of motivation).

It would seem that the necessary attributes to perform successfully depend largely upon what aspects of "success" one wishes to consider. School performance, as measured by GPA or instructors' ratings, requires one set of attributes. Performance on the job, whether in a large firm or smaller firm, requires a different set of characteristics. It is encouraging to note, however, that performance in school is fairly highly correlated with the certification test. This would seem to indicate that preparation offered in the schools is oriented toward the types of skills demanded for eventual certification. Additional data would have to be collected in order to more adequately describe these relationships.

Several problems and methodological issues should be raised with regard to these results. While a high degree of success was achieved in contacting former students and gathering information from members of the sample (in excess of 80 percent in all institutions), more time should elapse between graduation and post-graduation performance in order to provide more meaningful data. This is particularly true with regard to New York University, whose four-year program had not graduated a sufficient number of students within the five-year period covered by the study to yield an adequate sample. Furthermore, former graduates and employers should be more extensively followed up (beyond certification) in order to get a broader range and description of postgraduate performances.

Evaluation of postgraduate performance and relating measures of success to the predictor variables will be uncertain in that the level of success will also reflect the efficacy of the training received. In conjunction with test validation programs, the training curricula should also be considered. How effective are the various programs in providing

orthotists and prosthetists with the requisite skills demanded by the profession? In order to adequately conduct such evaluation, more broadly applicable criterion measures of success are needed. The measures should be meaningful across institutions. Starting salaries, employers' ratings, time of employment, are undesirable in this regard since they cannot be uniformly applied to each of the institutions. Criteria are indicated which are more intimately related to what orthotists and prosthetists are called upon to do in their daily professional lives. One approach to the problem of criterion development would be to do a job analysis or behavioral analysis of a select group of orthotists and prosthetists who have been judged by their peers as being "successful." The behaviors and patient-management practices of such a group could be carefully observed and documented. This would yield a profile of behaviors performed by the orthotist and prosthetist. Such data could then be used to evaluate former students and to relate "success" as measured by performance in these areas to aspects of their curricula. Information could then be provided to the institutions regarding curriculum development.

The results of this study will have a number of applications. Initially, the normative data should be applicable to the academic institutions. With the qualifications indicated, they should allow educators the capability of more accurately screening and selecting candidates for entry into their programs. Therefore the programs can be made more efficient in that only students with maximum promise of attaining success would be admitted. The study can also provide a model for program evaluation; that is, the information and methods derived from the study can be applied in the evaluation of the training programs. However, as described, further work is definitely needed.

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APPENDIX A

Name: _____
Last First Middle

Current Address: _____ _____
Number Street City State

Birthdate: _____ Place of Birth: _____
Month Day Year City State

Race: (Check one) Negro _____ Oriental _____ Caucasian _____

Nationality: _____

Your Current Marital Status: Single _____ Married _____ Separated _____
Divorced _____ Widower _____

EDUCATIONAL EXPERIENCE

1. Name of the High School you attended: _____

City _____ State _____

2. Rank the following subjects which you had in high school in terms of your degree of interest in them. If you did not have any classes in a certain area, draw a line through it. Let the number 1 stand for the subject you were most interested in, and the number 9 stand for the subject you were least interested in. Write your rankings in the spaces provided.

History _____ English _____ Mathematics _____ Physical Sciences _____

Social Studies _____ Language _____ Art _____ Wood or Metal Shop _____

Physical Education _____

3. Have you attended any trade or technical school? Yes _____ No _____

Name of School: _____

City _____ State _____

Type of Training: _____

Length of Program: _____

Did you receive a certificate of completion? Yes _____ No _____

If not, are you going to college at present? Yes _____ No _____

4. Have you attended college? Yes _____ No _____

Name of College: _____

City _____ State _____

Your major in college: _____

Your minor (if any): _____

Circle the number of semesters you have attended college:
1 2 3 4 5 6 7 8

Did you attend full-time _____ or part-time _____

5. How long have you been out of high school _____ or college _____

MILITARY EXPERIENCE

1. Have you been in the Armed Services? Yes _____ No _____

If you have been, in what Branch did you serve. Army _____ Navy _____
Air Force _____ Marines _____

What position did you hold? _____

What was your rank when you left the Service? _____

EMPLOYMENT HISTORY

1. Are you now employed? Yes _____ No _____

Name of firm: _____

Address: _____
Number Street City State

2. Have you ever worked for the Federal, State, or County government?

Yes _____ No _____

3. Have you ever supervised other persons? Yes _____ No _____

If you have, how many at one time? _____

4. Previous Occupational Positions:

Include any jobs you have had during the last four years and which you have held longer than three months. Also indicate any periods of unemployment. List the most recent position first:

Please use the attached sheet.

Describe your work experience. Begin with your most recent job and then work backwards.

1. Name of Firm: _____

   Location: _____
   Number Street City State

   Duties: _____

   _____

   _____

   Time period during which you held the job: _____

   Reason for leaving: _____

---

2. Name of Firm: _____

   Location: _____
   Number Street City State

   Duties: _____

   _____

   _____

   Time period during which you held the job: _____

   Reason for leaving: _____

---

3. Name of Firm: _____

   Location: _____
   Number Street City State

   Duties: _____

   _____

   _____

   Time period during which you held the job: _____

   Reason for leaving: _____

GROUP ACTIVITIES

1. List any group, club, or organization memberships.

2. If you were or are an officer in one or more of these organizations, circle the appropriate one(s).

In high school: _____

_____

_____

In college: _____

_____

_____

Outside of school: _____

_____

_____

INTERESTS

Have you ever had any hobbies? If so, list them. Indicate the amount of time you spent on each by putting 1, 2, or 3 next to the hobby.
1 -- a hobby you have spent alot of time on.
2 -- one which you spent a fair amount of time on.
3 -- one which you only spent a little time on.

_____

_____

_____

_____

ATHLETIC ACTIVITIES

1. Have you engaged in various sport activities? Yes _____ No _____

2. Was there a medical reason which prevented you from engaging in such activities? Yes _____ No _____

Place a check mark next to the sports which you have engaged in extensively.

Baseball _____ Basketball _____ Football _____ Track _____
Softball _____ Tennis _____ Wrestling _____ Weight Lifting _____
Bowling _____ Others (specify them) _____

_____

ATHLETIC ACTIVITIES (Cont'd)

3. Have you ever played on an organized team? If your answer is yes, circle the appropriate check mark(s) in the list above.

FAMILY DATA

1. Current marital status of parents: Married _____ Separated _____ Divorced _____
   Widow _____ Widower _____

2. Address(es) of parent(s):

   _____

   _____

3. Education of parents:

   Mother: High School _____ Technical or Trade School _____ College _____

   Father: High School _____ Technical or Trade School _____ College _____

4. Occupation:

   Mother: _____

   Father: _____

5. Number of brothers in your family: 0 1 2 3 4 5

   Number of sisters in your family: 0 1 2 3 4 5

6. Are you the youngest in your family? Yes _____ No _____

   The oldest? Yes _____ No _____

7. Number of places you have lived at in your lifetime, excluding military service.

   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15-20

APPENDIX B

ORTHOTICS-PROSTHETICS EMPLOYMENT INVENTORY

Please fill in the appropriate items in this questionnaire as completely as possible and use the provided self-addressed and stamped envelope to return the completed form.

Note that the information contained in this inventory will be used in an Orthotics-Prosthetics Student Descriptive project. We are primarily interested in determining what sorts of occupational activities former orthotics-prosthetics students might be involved in. Responses to particular items will of course be kept confidential.

1. Name_____ Today's Date_____

   Address_____

2. Where are you employed?

   Name of Firm_____

   Street Address_____

   City, State_____

3. Date of employment_____.

4. How many persons are employed at this firm?_____

5. If you are no longer actively involved in the area of Orthotics-Prosthetics please specify briefly why you are not working in the area._____

   _____

6. Please describe your reasons for initially entering the field of Orthotics-Prosthetics._____

   _____

   _____

7. How long have you been employed in your current position? Please check one.

   a. ____ less than six months

   b. ____ six months to one year

   c. ____ longer than one year.

8. Indicate how you originally learned of your job opportunity.

   a. ____through a relative

   b. ____from the school placement service

   c. ____by individual job hunting

   d. ____other (please specify)_____.

9. Did you encounter any particular difficulty in obtaining your employment? Yes____ No____

9a. If YES, please indicate generally the reason(s) for your difficulty.

   a. ____could not find jobs available in immediate geographical locale.

   b. ____found that employers were unwilling to hire personnel immediately out of school.

   c. ____Did not have appropriate background for available jobs

   d. ____Other (specify)_____.

10. Briefly describe those tasks that you most frequently perform while on the job._____

    _____

    _____

    _____

11. What particular aspects of your employment do you find most rewarding? (Indicate appropriate areas.)

a. ____ Pay structure (for example, level of starting salary, opportunities for pay increases, generous bonuses, etc.)

b. ____ Job security that is afforded.

c. ____ The tasks performed and quality of work required is especially suited for me.

d. ____ There is ample opportunity to work independently and to gain responsibilities.

e. ____ The job is highly structured so that I know well in advance precisely what is expected.

f. ____ Other (specify)_____

_____

12. Have you been satisfied with the amount of progress you have made in your career since completion of academic training? Yes___ No___

12a. If your answer was no, please indicate generally those areas in which you have not been entirely satisfied.

a. ____ amount of pay

b. ____ employee benefits

c. ____ sorts of tasks that I have been expected to perform

d. ____ other (specify)_____

_____

13. Do you plan to become certified? Yes____ No____

13a. If your answer was yes, how soon do you plan to take the certification exam? Approximate date_____

14. Beyond certification have you set any additional professional goals for yourself? Yes____ No____

14a. If your answer was yes, please briefly indicate these goals:____

_____

_____

15. Do you feel your academic training has adequately prepared you for your present position? Yes____ No____

16. What aspects, if any, of your educational experience might have been improved?_____

_____

School attended_____

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APPENDIX C

EMPLOYEE INFORMATION QUESTIONNAIRE

NOTE: THE INFORMATION CONTAINED IN THIS QUESTIONNAIRE WILL BE USED IN THE STRICTEST OF CONFIDENCE TO AID IN ASSESSMENT OF THE STUDENT SELECTION PROGRAM.

1. Today's Date_____.

2. Name of Graduate employed_____.

3. Date Employed_____.

4. Starting salary_____.

5. Is a salary increase anticipated? Yes____ No____.
   If so, how much of a salary increase is expected?_____.

6. List the employee's primary responsibilities in order of importance:

   a._____.

   b._____.

   c._____.

   d._____.

   e._____.

7. Rate the employee's performance in fulfilling these responsibilities. (Consider a rating of 4 as being outstanding, 3 as being good, 2 as fair, and 1 as poor).

   a._____.

   b._____.

   c._____.

   d._____.

   e._____.

8. Does the employee demonstrate leadship ability? Yes____. No____.
   If YES please specify those areas in which the employee's leadership ability most pronounced.

   a._____.

   b._____.

   c._____.

   d._____.

   e._____.

9. Rate the degree to which the employee maintains cordial relations with his fellow workers. (4-outstanding, 3-good, 2-fair, and 1-poor).

_____.

10. Approximately how much time has the employee been absent from work because of illness or for other reasons?

_____.

Please specify reasons that have been given for absences.

a._____.

b._____.

c._____.

d._____.

11. Rate the degree of puntuality of the employee in arriving for work and for appointments. (Consider a rating of 4 as being punctual, 3 as being punctual most of the time, 2 as being punctual some of the time, and 1 as being rarely punctual.) _____.

12. Does the employee demonstrate any particularly unusual qualities that would tend to make him an outstanding employee or less than satisfactory employee?

YES_____. NO_____. Please specify.

a._____.

b._____.

c._____.

d._____.

13. If employee is no longer working for you, when was employment terminated?

Date_____.

14. Reason(s) for termination of employment._____

_____

_____

_____.

APPENDIX D

LENGTH OF TIME AT CURRENT POSITION CORRLEATION MATRIX

Variable	1	2	3	4	5
Cerritos					
Reasons for entering field	--	-.027	-.141	-.037	.430
Type of professional goals		--	-.139	-.035	.287
Scale #1 MMPI			--	.230	-.325
Scale #6 MMPI				--	-.158
Length of time at current position					--
Northwestern					
Otis Mental Abilities	--	.287	.105	-.059	.356
Previous education level		--	.133	.004	-.220
Pers.-Soc. COII			--	.360	.272
Manipulative COII				--	-.161
Length of time at current position					--
NYU					
Bennett Mech. Comp.	--	-.207	-.111	-.030	.694
Satisfaction with progress		--	.219	-.326	.218
ATDP			--	.398	-.360
Otis mental abilities				--	.059
Length of time at current position					--
UCLA					
Scale #9, MMPI	--	.272	-.365	.334	-.461
Most rewarding aspects		--	.081	.036	-.451
Types of professional goals			--	-.634	.394
Scale #7, MMPI				--	-.029
Length of time at current position					--

REGRESSION ANALYSES WITH LENGTH OF TIME AT CURRENT POSITION AS CRITERION MEASURE

Variable	Multiple R	Multiple R^2	Change in R^2	F
Cerritos				
1. Reasons for entering field	.430	.185	.185	3.184
2. Type of professional goals	.524	.275	.089	2.465
3. Scale #1 MMPI	.571	.326	.051	1.936
4. Scale #6 MMPI	.620	.385	.058	1.722
Predicted = .179 (Reasons for entering field) + .392 (Type of professional goals - .021 (Scale #1 MMPI) - .021 (Scale #6, MMPI) + 1.263				
NYU				
1. Bennett Mech.	.694	.481	.481	7.438
2. Satisfaction with progress	.786	.618	.137	5.685
3. ATDP	.868	.754	.135	6.132
4. Otis	.987	.976	.221	50.950
Predicted = .028 (Bennett mech.) + 1.407 (satisfaction - .020 (ATDP) + .066 (Otis) - 5.968				
Northwestern				
1. Otis	.356	.127	.127	2.331
2. Previous education level	.490	.240	.113	2.378
3. Pers.-soc. COII	.562	.315	.075	2.155
4. Manipulative COII	.615	.379	.063	1.986
Pedicted = .014 (Otis) - .278 (Previous ed. level) + .011 (Pers.-soc., COII) - .018 (Manipulative, COII) + 5.070				
UCLA				
1. Scale #9, MMPI	.461	.212	.212	2.969
2. Most rewarding aspects	.572	.327	.114	2.434
3. Types of professional goals	.654	.428	.100	2.245
4. Scale #7, MMPI	.750	.562	.134	2.573
Predicted = -.018 (Scale #9, MMPI) - .336 (Most rewarding aspects) + .915 (Types of professional goals) + .050 (Scale #7, MMPI) - .500				

APPENDIX E

STARTING SALARY CORRELATION MATRIX

Variable	1	2	3	4	5
Cerritos					
1. Size of firm	--	-.557	.159	.011	-.557
2. Two most rewarding aspects		--	.011	-.154	-.459
3. Scale #6, MMPI			--	.069	.257
4. Computational interests, COII				--	-.250
5. Starting salary					--
NYU					
1. Most interesting course work	--	.311	.083	.302	-.193
2. Scale #6, MMPI		--	.581	.093	-.299
3. Scale #4, MMPI			--	.295	.187
4. Bennett mech.				--	-.110
5. Starting salary					--
Northwestern					
1. Currently employed (at entry to program)	--	-.194	-.183	-.114	-.401
2. Otis		--	.548	-.036	-.246
3. DAT-space relations			--	-.125	.161
4. Scale #8, MMPI				--	-.225
5. Starting salary					--
UCLA					
1. Scale #4, MMPI	--	-.490	-.267	-.116	.389
2. Reasons for entering field		--	-.507	-.048	-.149
3. Birth order			--	.584	-.345
4. Previous education level				--	-.149
5. Starting salary					--

REGRESSION ANALYSES WITH STARTING SALARY CRITERION MEASURE

Variable	R	R^2	Change in R^2	F
Cerritos				
1. Size of firm	.557	.310	.310	6.300
2. Two most rewarding aspects	.742	.551	.241	7.994
3. Scale #6, MMPI	.825	.681	.130	8.560
4. Computational, COII	.896	.804	.122	11.301
Predicted = -23.99 (Size of firm) - 11.918 (Two most rewarding aspects of O-P) + 1.36 (Scale 6, MMPI) - .426 (Computational, COII) + 83.092				
NYU				
1. Most interesting course work	.493	.243	.243	2.573
2. Scale #6, MMPI	.686	.471	.227	3.120
3. Scale #4, MMPI	.865	.748	.277	5.952
4. Bennett	.993	.987	.238	98.500
Predicted = 5.128 (Most interesting course work) - 2.508 (Scale #6, MMPI) + 1.949 (Scale #4, MMPI) + .468 (Bennett) + 93.392				
Northwestern				
1. Currently employed	.401	.160	.160	3.066
2. Otis	.519	.270	.109	2.779
3. DAT-space relations	.607	.368	.098	2.726
4. Scale #8, MMPI	.657	.432	.063	2.476
Predicted = 9.845 (currently employed) - .220 (Otis) + .124 (DAT-space relations) - .208 (Scale #8, MMPI) + 101.374				
UCLA				
1. Scale #4, MMPI	.389	.151	.151	1.966
2. Reasons for entering field	.765	.585	.434	7.076
3. Birth order	.857	.735	.149	8.359
4. Previous education level	.984	.969	.233	63.724
Predicted = -162.402 (Scale #4, MMPI) + 1172.358 (reasons for entering field) + 1451.425 (Birth order) - 404.642 (Previous education level) - 6496.145				

APPENDIX F

LENGTH OF EMPLOYMENT CORRELATION MATRIX

Variable	1	2	3	4	5
Cerritos					
1. No. of professional goals	--	.187	-.333	.136	.554
2. Most rewarding aspects of O-P		--	-.088	.164	-.073
3. Type of professional goals			--	-.378	-.027
4. ATDP				--	.187
5. Length of employment					--
NYU					
1. L scale MMPI	--	-.026	.154	-.381	-.623
2. Most rewarding aspects of O-P		--	-.559	.088	-.366
3. Size of firm			--	.313	-.297
4. Bennett mech.				--	.289
5. Length of employment					--
Northwestern					
1. No. of professional goals	--	-.187	.228	-.177	.542
2. Type of previous work		--	-.255	.158	-.428
3. Currently employed (at entry into program)			--	-.116	.445
4. Scale #2, MMPI				--	-.357
5. Length of employment					--
UCLA					
1. Computational COII	--	.163	.115	.016	.544
2. Size of firm		--	.500	-.110	.487
3. Attended previous college			--	.137	.458
4. Currently employed (at entry into program)				--	.292
5. Length of employment					--

REGRESSION ANALYSES WITH LENGTH OF EMPLOYMENT AS CRITERION MEASURE

Variable	R	R^2	Change in R^2	F
Cerritos				
1. No. of professional goals	.554	.307	.307	6.209
2. Most rewarding aspects of O-P	.583	.340	.033	3.353
3. Type of professional goals	.605	.366	.026	2.314
4. ATDP	.641	.411	.044	1.921
Predicted = 1.031 (No. of professional goals) - .197 (Most rewarding aspects) + .675 (Type of professional goals) + .017 (ATDP) - 2.024				
NYU				
1. L scale, MMPI	.623	.388	.388	5.079
2. Most rewarding aspects of O-P	.731	.535	.146	4.032
3. Size of firm	.889	.791	.256	7.594
4. Bennett	.993	.987	.195	97.821
Predicted = 0.037 (L scale, MMPI) - 1.222 (Most rewarding aspects of O-P) - 1.273 (size of firm) + .028 (Bennett) + 7.722				
Northwestern				
1. No. of professional goals	.542	.294	.294	6.680
2. Type of previous work	.636	.405	.110	5.105
3. Currently employed	.688	.474	.069	4.208
4. Scale #2, MMPI	.720	.518	.044	3.504
Predicted = .836 (No. of professional goals) - .438 (Type of previous work) + .863 (currently employed) - .029 (Scale #2, MMPI) + 2.628				
UCLA				
1. Computational, COII	.544	.296	.296	4.632
2. Size of firm	.678	.459	.163	4.256
3. Attended previous college	.790	.624	.165	4.999
4. Currently employed	.835	.697	.072	4.618
Predicted = .022 (Computational, COII) + .794 (Size of firm) + 2.025 (Attended previous college) + .781 (currently employed - at entry into program) - 5.421				